



PERFORMANCE AUDIT REPORT

Department of Transportation *December 2023*

Jason E. Mumpower
Comptroller of the Treasury



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JASON E. MUMPOWER
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December 11, 2023

The Honorable Randy McNally
Speaker of the Senate
The Honorable Cameron Sexton
Speaker of the House of Representatives
The Honorable Kerry Roberts, Chair
Senate Committee on Government Operations
The Honorable John D. Ragan, Chair
House Committee on Government Operations
and
Members of the General Assembly
State Capitol
Nashville, Tennessee 37243
and

The Honorable Butch Eley, Commissioner
Tennessee Department of Transportation
James K. Polk Bldg, Suite 700
505 Deaderick Street
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Ladies and Gentlemen:

We have conducted a performance audit of selected programs and activities of the Department of Transportation for the period July 1, 2019, through September 30, 2023.¹ This audit was conducted pursuant to the requirements of the Tennessee Governmental Entity Review Law, Section 4-29-111, *Tennessee Code Annotated*.

Our audit disclosed certain findings, conclusions, and recommendations in this report. Management of the Department of Transportation has responded to the audit findings, conclusions, and recommendations, and we have included the responses in the respective sections. We will follow up on the audit to examine department management's corrective actions instituted because of the audit findings.

This report is intended to aid the Joint Government Operations Committee in its review to determine whether the Department of Transportation should be continued, restructured, or terminated.

Sincerely,

A handwritten signature in blue ink that reads "Katherine J. Stickel".

Katherine J. Stickel, CPA, CGFM, Director
Division of State Audit

KJS/dw/ljs
23/035

¹ For certain audit objectives, which can be found in Appendix 1 under the Methodologies, our audit scope extended beyond this period.

DEPARTMENT OF TRANSPORTATION

AUDIT HIGHLIGHTS

Department of Transportation's Mission

To provide a safe and reliable transportation system that supports economic growth and quality of life.

We have audited the Department of Transportation for the period July 1, 2019, through September 30, 2023. Our audit scope included assessments of program effectiveness, efficiency, internal controls, prospective analysis, and compliance with laws, regulations, policies, procedures, and provisions of contracts or grant agreements in the following areas:

Scheduled Termination:
June 30, 2024

- management's plan to address their identified infrastructure challenges—workforce, congestion, delivery, and funding;
- management's process to replace aging information systems;
- management's oversight of the operations of the rest area system;
- management's responsibility for maintaining state park roads; and
- management's development of a comprehensive risk assessment.

Additionally, our audit scope included follow-up on prior audit findings in the following areas:

- management's process to complete the information systems disaster recovery plan;
- management's inspection procedures to ensure timely repairs of railroad crossing surfaces that inspectors identified as poor as well as follow-up on complaints about railroad crossings; and

- management’s process to complete subrecipient risk assessments for all program areas.

The information for these areas can be found in the **Prior Audit Findings** section on page 14.

Key Conclusions

Findings

- For the previous six years, the department did not participate in formal information systems planning activities as required by state policies and, as a result, severely hampered the department’s ability to support its strategic initiatives to upgrade and replace critical information systems (page 51).
- The department did not provide adequate internal controls in one area, increasing the risk of unauthorized access to department systems and disruption to department services (page 53).
- The Office of Rail Safety and Inspection lacks key program management components—such as a reliable information system and adequate controls for railroad crossing inspection and complaint procedures—to ensure the railroad program is meeting its objective for safe crossings (page 61).
- Management did not oversee the work of the facilities manager and did not establish an effective monitoring process for ensuring that Tourist Development and the contractor maintained the rest areas and welcome centers in good working order (page 80).
- Management did not establish a process for reviewing and approving the Department of Tourist Development’s welcome center expenditures (page 88).
- Management’s risk assessment process fell short in addressing the department’s risks and developing controls to ensure it is fulfilling its mission and vision (page 105).

Observations

The following topics are included in this report because of their effect on the operations of the Department of Transportation and the citizens of Tennessee:

- Management should ensure full transparency when sharing project cost savings data with stakeholders (page 39).
- Management should evaluate their cost-estimating process to better plan for future changes in construction costs and delivery (page 43).

- Tennessee continues to face challenges with railroad companies not repairing rail crossings (page 68).
- Tennessee's rest area system facilities are aging, and the department lacks the maintenance expertise for many repairs (page 86).
- Department of Transportation and Department of Environment and Conservation managements disagree about which entity is responsible for maintaining roads in natural areas **outside** the boundaries of state parks (page 101).

Matter for Consideration

- Management should consider clarifying options for the state's responsibilities for welcome centers and rest areas (page 92).

Emerging Issues

- Choice lanes are the department's main solution to address urban congestion, which will require extensive planning and oversight to identify and respond to new risks (page 28).
- Railroad crossings blocked by trains for extended periods of time are a safety issue gaining attention nationwide (page 72).
- Nationwide concerns surrounding the sufficiency of safe parking for commercial motor vehicles also impact Tennessee's goal to provide safe parking for commercial motor vehicles (page 93).

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Introduction

Audit Authority

This performance audit of the Department of Transportation was conducted pursuant to the Tennessee Governmental Entity Review Law, Title 4, Chapter 29, *Tennessee Code Annotated*. The Comptroller of the Treasury is authorized under Section 4-29-111 to conduct a limited program review audit of the agency and to report to the Joint Government Operations Committee of the General Assembly. This audit is intended to aid the committee in determining whether the department should be continued, restructured, or terminated.

Background

In 1915, legislative action established the State Highway Commission to oversee the Tennessee highway system. The state transportation system at the time had less than 5,000 miles of roadways. In 1923, the commission became the Department of Highway and Public Works. Over time, Tennessee's transportation system grew to include other modes of transportation. In 1972, the General Assembly renamed the Department of Highways and Public Works the Department of Transportation.

The Department's Vision is commitment to excellence in managing and improving the state's transportation system, promoting the success of our employees, and strengthening the trust of our customers.

—2023 Primer

The department is a multimodal agency that provides support and oversight for aviation, public transit, waterways, railroads, highways and roads, and bicyclist and pedestrian facilities. As of March 1, 2023, the department had 4,039 authorized, full-time positions across four statewide regional facilities (Jackson, Nashville, Chattanooga, and Knoxville) and headquarters (Nashville). See the department's regions in **Exhibit 1**.

Exhibit 1
TDOT Regions

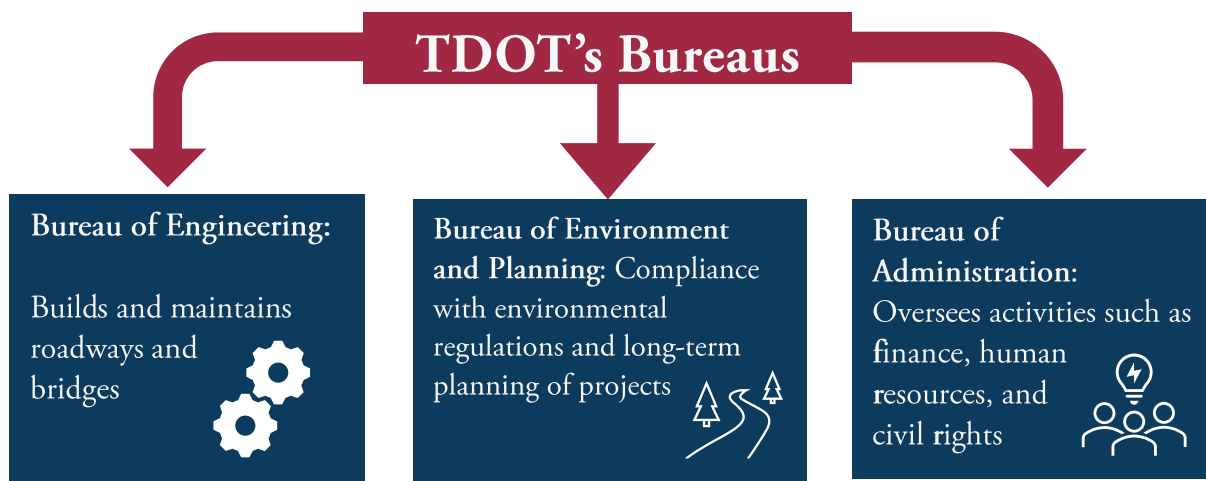


Source: Created by auditor based on an informational map from the department's website.

Organizational Structure

The department is overseen by the Commissioner's Office and is divided into three bureaus: the Bureau of Administration, the Bureau of Environment and Planning, and the Bureau of Engineering. Each bureau is further divided into various divisions, as explained in **Appendix 3**, and **Appendix 4** is the department's organizational chart. **Exhibit 2** provides a broad overview of each bureau's roles and responsibilities: the Bureau of Administration oversees the department's administrative activities, while the Bureau of Environment and Planning administers the environmental and planning activities of the department, such as environmental compliance, rural planning, and technical studies. The Bureau of Engineering develops, preserves, and maintains the state highway system while also helping local counties and cities develop their own highway infrastructure.

Exhibit 2
Organizational Bureaus



Source: Created by auditor based on the department's website.

The State's Transportation System

The department publishes an annual report that highlights the department's goals and current affairs, called a Primer. The department's 2023 Primer reports that Tennessee is home to more than 96,187 miles of roadway and 20,034 bridges, as shown in Exhibit 3.

Exhibit 3
Tennessee Transportation System

 96,187 miles of roadway	 8,443 state-owned bridges 11,591 locally owned bridges
 71 general aviation airports 6 commercial airports	 19 rest areas 16 welcome centers
 23 short line railroads	 28 public transit systems (bus, van, rail) serving all 95 counties
 934 miles of state routes with sidewalks 487 miles of greenways and trails	 4,557 miles of state routes that can be used by bicyclists

Source: Created by auditor using information from the department's 2023 Primer.

In addition, Tennessee is connected to many transportation modes aside from just roadway and aviation travel. According to a study completed by Tennessee State University, in Memphis there are direct rail connections for all five major Class I railroads with routes to cities in all parts of the country. The state's large number of waterways and direct entry to the Tennessee River, Cumberland River, and Mississippi River also provide significant access.

Of the 96,187 miles of roadway in the state, the department is responsible for 14,467 miles of state highways and 1,201 miles of interstates, which is 16% of road miles in the state. While the department only maintains these 15,668 miles, these specific roadways are significant in terms of the state's overall road usage. In 2021, the interstates alone only accounted for 1.3% of road miles in the state but supported 30% of all road usage.

Transportation System Funding

In order to build and maintain the state's transportation system, the department receives funding from a variety of sources. As shown in **Table 1**, for fiscal year 2021 – 2022, the department's largest funding source was from federal government agencies, almost **\$1.16 billion**. Of this federal funding, 94% was from the Federal Highway Administration's Highway Construction program, as shown in **Exhibit 4**. These funds are used to design, build, and maintain roadways and bridges throughout the state. For more information on the department's actual and budgeted expenditures and revenues, see **Appendix 7**.

Table 1
Department Expenditures
July 1, 2021, Through June 30, 2022

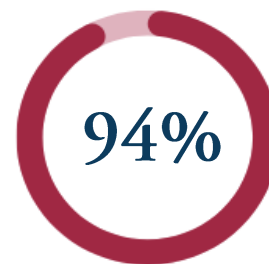
Type	Amount
Federal	\$1,159,858,300
State	\$1,051,731,200
Cities and Counties	\$55,483,300
Total	\$2,267,072,800

Source: Created by auditor based on actual 2021-2022 expenditures in the 2023-2024 State of Tennessee budget.

In Tennessee, the type of road determines how construction and maintenance of the roadway is funded. Cities and counties are responsible for locally owned roads, while the state is responsible for state highways, national highways, and the interstate system.

In terms of state funding, the department collects revenue from taxes and fees. Specifically, state revenues come from the state gas tax, the motor fuel tax, the gas inspection tax, and vehicle registration fees. From each revenue source, cities and counties also receive a portion of the tax or fee as specified in state statute. Comparatively, Tennessee's gas tax is lower than 52% of other states, and the state's tax on diesel fuel is lower than 58% of other states in the country. This means that Tennessee roadway users pay less in taxes for their use of the roadways than individuals in some other states, such as California. Before the passage of the IMPROVE Act in 2017, the state's fuel taxes had remained unchanged since 1989.

Exhibit 4



of federal funds expended in FY22
were for
**Highway Planning and
Construction**

Source: FY22 Statement of Expenditures of
Federal Awards.

Nationwide Funding Comparisons With a Southeastern Focus

The state's highway spending is comparable to that of most other southeastern states

The amount spent on highways varies greatly across the United States, ranging from \$301 million in Hawaii to \$17.6 billion in Texas. According to data from the Federal Highway Administration, the average amount states spent on highways in 2021 was \$3.6 billion. Tennessee's state highway spending was just over \$2.4 billion, similar to South Carolina's and Arkansas's highway spending, as shown in Exhibit 5. We compiled population, roadway miles, highway spending, and debt obligations for 2021 for all southeastern states in Table 2.

Exhibit 5
State Highway Spending for 2021



Source: Graphics were created by the auditor using suncatcherstudios.com. Spending data was obtained from the Federal Highway Administration.

Table 2
Southeastern States Transportation Systems Funding
For 2021

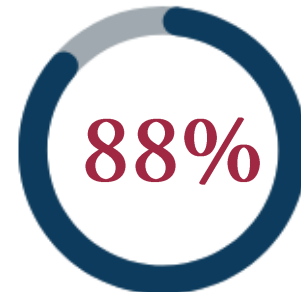
State	Population	Roadway Miles	Highway Spending	Debt Expenditures
Alabama	5,049,846	100,177	\$1,988,362,000	\$1,267,450,000
Arkansas	3,028,122	99,332	\$2,464,340,000	\$287,655,000
Florida	21,828,069	123,652	\$12,256,184,000	\$13,227,909,000
Georgia	10,788,029	125,701	\$3,854,015,000	\$2,470,586,000
Kentucky	4,506,589	79,902	\$2,551,140,000	\$1,462,955,000
Louisiana	4,627,098	65,918	\$2,656,100,000	\$4,751,957,000
Mississippi	2,949,586	77,514	\$1,368,042,000	\$1,136,346,000
Missouri	6,169,823	132,708	\$2,581,499,000	\$1,408,715,000
North Carolina	10,565,885	108,074	\$5,672,816,000	\$4,185,698,000
South Carolina	5,193,266	79,200	\$2,219,013,000	\$260,330,000
Tennessee	6,968,351	96,319	\$2,441,077,000	-
Virginia	8,657,365	75,658	\$6,218,981,000	\$4,158,283,000
West Virginia	1,785,526	38,837	\$1,449,306,000	\$2,468,026,000

Source: Created by auditor based upon statistics obtained from the Federal Highway Administration, U.S. Census Bureau, and Bureau of Transportation Statistics.

As shown in **Table 2**, although states may have a similar number of roadway miles, they can vary drastically in other metrics, as evidenced by spending differences for the states of Georgia and Florida. While all states in the table are in the Southeast, even climate and weather conditions can have drastically different impacts that can affect the cost of building and maintaining infrastructure. And although the federal government provides funding for these infrastructure projects, state leaders are responsible for determining what is best for their community and which projects are needed most. Given this autonomy, the amount spent on different infrastructure budget categories also varies.

The Federal Highway Administration breaks the states' total spending for highways into six major areas: construction, maintenance, administration and planning, highway enforcement and safety, debt obligations, and grants to local governments. Funds spent on construction, maintenance, and grants to local governments are used to directly fund needed transportation projects. As shown in **Exhibit 6**, in 2021, 88% of the department's total spending was on highway construction projects, to maintain the state's existing transportation system, and on road and bridge construction grants to local governments. The department spent the remaining 12% on administrative activities, planning, and highway safety enforcement.

Exhibit 6
Percentage of the
Department's Spending
Used for Construction,
Maintenance, and Grants
For 2021



Source: Created by the auditor based on data from the Federal Highway Administration.

How Tennessee Compares Nationally

Almost 95% of roads in Tennessee are in acceptable condition

Roads are the department's largest asset and require continued maintenance to remain in a "state of good repair."² Multiple factors affect road conditions, such as traffic volume, vehicle loads, construction quality and materials, pavement design, and weather-related erosion. Pavement conditions are measured by the International Roughness Index (IRI), a grading system used by highway professionals worldwide to determine how rough the surface of a roadway is. The roads are then classified into one of three categories: good, fair, or poor. The federal Bureau of Transportation Statistics considers "acceptable" condition to be the percentage of roads in the state that are in good or fair condition. The Federal Highway Administration requires states to report road conditions every two years.

Management from the department's Maintenance Division explained that roads in poor condition are more costly to repair than those in good or fair condition because roads in poor condition are more likely to need foundational repair and/or replacement. In an effort to extend the life of Tennessee roads, the department strives to maintain assets at the lowest cost by balancing road maintenance to ensure it is neither too frequent nor delayed too long. As part of the maintenance process, the department uses a variety of preventive maintenance techniques, such as scheduling day-to-day maintenance activities, patching potholes, and concrete joint replacement. The department also uses a series of low-cost, preservation treatments that will last a few years, such as thin asphalt overlays and sealing cracks in pavement.

According to 2020 data³ from the Bureau of Transportation Statistics, **94.6%** of Tennessee roads are in acceptable condition. **Figure 1** shows how Tennessee roads compare with neighboring southeastern states. Not only did Tennessee have the highest percentage of roads in acceptable condition in the Southeast, but Tennessee had the highest percentage of roads in acceptable condition nationwide. See **Appendix 5** for nationwide road conditions.

Exhibit 7 National Rank for 2020

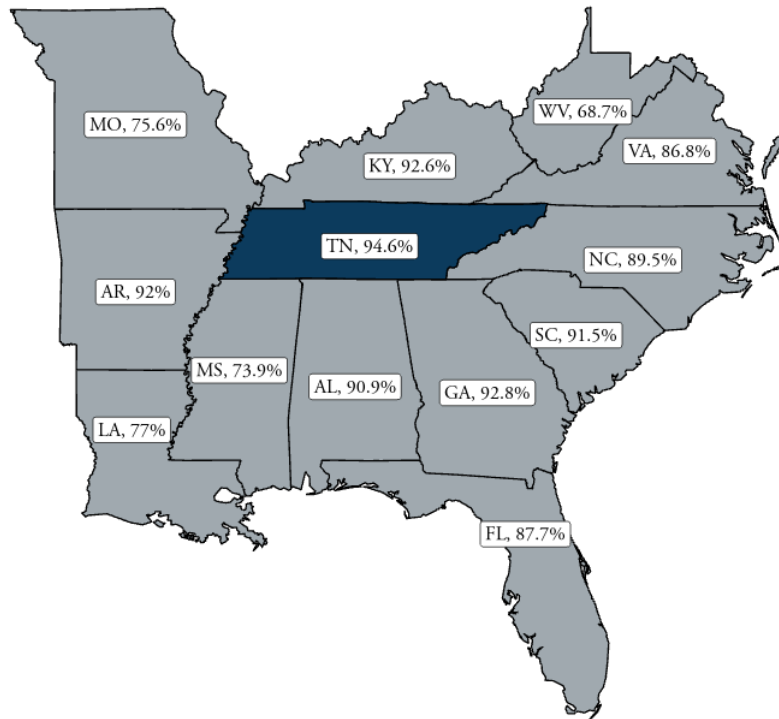


Source: The Bureau of Transportation Statistics.

² According to Title 49, *Code of Federal Regulations*, Part 625, "a capital asset is [considered] in a state of good repair if [the asset] is in a condition sufficient for the asset to operate at a full level of performance."

³ The Federal Highway Administration requires each state to collect and report this data in accordance with its data collection standards.

Figure 1
Percentage of Roads in Acceptable Condition for
Southeastern States
As of 2020



Source: Created by auditor based on data from the Bureau of Transportation Statistics.

In addition to prioritizing road conditions, **improving roadway safety** is important to the department and its goals. As of 2020, the state ranked seventh in the nation for most roadway fatalities, but this statistic can vary greatly depending on the size of the state and usage of the state's roads. The state's 2020 – 2024 Strategic Highway Safety Plan (the plan) serves as the comprehensive safety road map to identify issues related to severe crashes and mitigate these issues. The department works in partnership with the Tennessee Department of Safety and Homeland Security and federal agencies, including the Federal Highway Administration, to create this plan to help reduce fatalities in the state through education, enforcement, engineering, and emergency response.

The plan explains that analyzing the number of fatalities in comparison to the number of miles traveled helps provide the perspective necessary to see trends. Roadway fatalities and serious accidents have decreased sharply since 1950, when there were 8.58 highway fatalities for every 100 million miles traveled. In 2020, there were only 1.59 highway fatalities for every 100 million miles traveled. Since 2000, however, Tennessee's fatality rate has declined very slowly and even increased recently. Although the state's rate moves in a similar trend to the nationwide rate, Tennessee's rate is consistently higher than the national average, as shown in Table 3 and Graph 1.

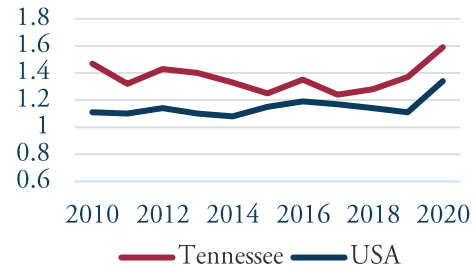
Table 3
Roadway Fatalities for
2000, 2010, and 2020

Location	Year	Fatality Rate*
Tennessee	2000	1.98
Nationwide	2000	1.53
Tennessee	2010	1.47
Nationwide	2010	1.11
Tennessee	2020	1.59
Nationwide	2020	1.34

Source: Created by auditor based on data from the National Highway Traffic Safety Administration.

* The fatality rate is calculated per 100 million miles traveled.

Graph 1
Roadway Fatality Rates for
January 1, 2010, Through
December 31, 2020



Source: Created by auditor based on data from the Tennessee Department of Safety and Homeland Security and the Bureau of Transportation Statistics.

The department has created urban and rural initiatives to help lower the number of fatalities and serious crashes

The Department of Transportation uses roadway data from its Enhanced Tennessee Roadway Information Management System along with crash data from the Department of Safety and Homeland Security to engineer infrastructure improvements in roadway safety and design. The department's plan states that historical data indicates severe crashes are more likely to occur on rural roads. To help address this, the department implemented the Local Roads Safety Initiative to identify rural areas with increased severe crash statistics and prioritize safety improvements to those roads.

To help increase safety on urban roadways, the department implemented the HELP Program in 1999. This program works in conjunction with other emergency response agencies as part of the highway incident management team. As shown in **Figure 2**, the HELP Program is most often recognized by bright yellow trucks with message boards that work to reduce congestion, notify motorists, and aid the public by quickly clearing roadways in all situations.

Figure 2
HELP Truck at Crash Site



Source: The Tennessee Strategic Highway Safety Plan for 2020-2024.

Tennessee's Bridges

Bridges are another of the department's largest assets. The department inspects bridges using the Federal Highway Administration's National Bridge Inspection Standards and classifies them as either good, fair, or poor. Each inspection looks at the surface of the bridge and the substructures that support it. The Federal Highway Administration requires state departments of transportation to inspect all bridges at least once every two years. Based on data⁴ from the Bureau of Transportation Statistics, **Tennessee ranks 10th in the nation for having the greatest number of bridges and 24th in the nation for the percentage of acceptable bridges.** Because Tennessee has more bridges than many other states, the state must also spend more to maintain this greater number of assets. **Table 4** looks at the condition of state bridges and compares Tennessee's percentage of acceptable bridges to that of other southeastern states. See **Appendix 6** for nationwide bridge condition comparisons.

Table 4
Bridge Conditions in Southeastern States
As of 2021

State	Total No. of Bridges	Percentage of Acceptable Bridges
Alabama	16,164	98.48%
Arkansas	12,941	95.16%
Florida	12,680	97.40%
Georgia	14,987	98.90%
Kentucky	14,410	95.21%
Louisiana	12,782	91.50%
Mississippi	16,788	96.30%
Missouri	24,590	91.63%
North Carolina	18,877	94.18%
South Carolina	9,395	95.56%
Tennessee	20,331	95.34%
Virginia	13,997	96.49%
West Virginia	7,314	85.21%

Source: Created by auditor based on data from the Bureau of Transportation Statistics.

⁴ The Federal Highway Administration requires each state to collect and report this data in accordance with its data collection standards.

Audit Scope

We have audited the Department of Transportation for the period July 1, 2019, through September 30, 2023. Our audit scope included assessments of program effectiveness, efficiency, internal controls, prospective analysis, and compliance with laws, regulations, policies, procedures, and provisions of contracts or grant agreements in the following areas:

- management’s plan to address their identified infrastructure challenges—workforce, congestion, delivery, and funding;
- management’s process to replace aging information systems;
- management’s oversight of the operations of the rest area system;
- management’s responsibility for maintaining state park roads; and
- management’s development of a comprehensive risk assessment.

Additionally, our audit scope included **follow-up on prior audit findings** in the following areas:

- management’s process to complete the information systems disaster recovery plan;
- management’s inspection procedures to ensure timely repairs of railroad crossing surfaces that inspectors identified as poor as well as follow-up on complaints about railroad crossings; and
- management’s process to complete subrecipient risk assessments for all program areas.

The information for our follow-up on prior audit findings can be found in the **Prior Audit Findings** section.

We present more detailed information about our audit objectives, conclusions, and methodologies in Appendix 1 of this report.

We provide further information on internal control significant to our audit objectives in **Appendix 2**. In compliance with generally accepted government auditing standards, when internal control is significant within the context of our audit objectives, we include in the audit report (1) the scope of our work on internal control and (2) any deficiencies in internal control that are significant within the context of our audit objectives and based upon the audit work we performed.

For our sample design, we used nonstatistical audit sampling, which was the most appropriate and cost-effective method for concluding on our audit objectives. Based on our professional judgment, review of authoritative sampling guidance, and careful consideration of underlying statistical concepts, we believe that nonstatistical sampling provides sufficient appropriate audit evidence to support the conclusions in our report. Although our sample results provide reasonable bases for drawing

conclusions, the errors identified in these samples cannot be used to make statistically valid projections to the original populations.

We conducted our audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

The Department of Transportation's management is responsible for establishing and maintaining effective internal controls and for complying with applicable laws, regulations, policies, procedures, and provisions of contracts and grant agreements.

Single Audit

As part of the annual Single Audit of the State of Tennessee, the Comptroller of the Treasury's Division of State Audit performs a risk assessment and audits certain federal programs administered by state agencies. We review the systems of internal control over federally funded programs and compliance with program regulations. The audit's objective is to determine the state's compliance with federal requirements regarding how those funds were used. For the audit period covered by this performance audit, the Department of Transportation's Aeronautics, Multimodal Transportation, Finance, Program Development and Administration, Engineering, Right-of-Way, Construction, Materials and Tests, and Utilities divisions were included in the state's fiscal year 2019, 2020, 2021, and 2022 Single Audits as described in Table 5.

Table 5
Single Audit Findings – Department of Transportation

Federal Program (Division)	Findings by Fiscal Year			
	2019	2020	2021	2022
Airport Improvement Program (Aeronautics Division)	4	2	0	0
Alcohol Open Container Requirements (Program Development and Administration Division)	N/A*	0	N/A	N/A
Formula Grants for Rural and Tribal Transit Programs (Multimodal Transportation Division)	N/A*	N/A	0	N/A
Highway Planning and Construction Program (Finance, Program Development and Administration, Engineering, Right-of-Way, Construction, Materials and Tests, and Utilities Divisions)	N/A*	N/A	0	N/A
Total Findings	4	2	0	0

Source: *Single Audit Reports* for fiscal years 2019, 2020, 2021, and 2022.

* Programs marked N/A were not audited in that fiscal year's Single Audit.

In response to audit findings and recommendations, the department must develop corrective action plans to submit to the appropriate federal awarding agency. The federal grantor is responsible for issuing final management decisions on the department's findings, including any directives to repay the federal grants. Our office is required to determine whether the department has taken full corrective action, partial corrective action, or no action. We are currently auditing the funds received through the American Rescue Plan Act through the Federal Aviation Administration (Airport Improvement Program) and Federal Transit Administration (Formula Grants for Rural and Tribal Transit Programs). The results of our audit work will be reported in the state's 2023 Single Audit by March 31, 2024.

Prior Audit Findings

Report of Actions Taken on Prior Audit Findings

Section 8-4-109(c), *Tennessee Code Annotated*, requires that each state department, agency, or institution report to the Comptroller of the Treasury the action taken to implement the recommendations in the prior audit report. The prior audit report was dated August 2019 and contained three findings. The department filed its report with the Comptroller of the Treasury on February 12, 2020. We conducted a follow-up of the prior audit findings as part of the current audit.

Resolved Audit Findings

The current audit disclosed that the department resolved two previous audit findings. See Table 6.

Repeated Audit Findings

The current audit also disclosed that one finding from the previous audit was not resolved and will be repeated. See Table 6 for more information on the resolution of this finding.

Department of Transportation Audit Findings

August 2019

Performance Audit

3 findings

2 observations

December 2023

Performance Audit

Resolved 2 prior audit findings

1 repeat finding

5 new findings

5 observations

3 emerging issues

Table 6
Current Audit Results for Prior Performance Audit Findings

	Prior Audit Finding	Finding Year	Resolution in Current Audit
1	Management's inspection procedures were inefficient and lacked an effective process to ensure timely repairs of railroad crossing surfaces that inspectors identified as poor.	2019 Audit	Repeat finding. See Finding 3 in the Rail Safety Inspection Program section.
2	Management did not ensure all program areas completed subrecipient risk assessments as required	2019 Audit	This finding was resolved. See Appendix 1 for more information.
3	The department did not provide adequate internal controls in one specific area	2019 Audit	This finding was resolved. See Appendix 1 for more information.

Audit Conclusions

The Department of Transportation's Challenges for Tennessee's Infrastructure System

The Department of Transportation's mission is to *"provide a safe and reliable transportation system that supports economic growth and quality of life."* Tennessee's infrastructure system has reached a critical point where it is unable to support the volume of people who currently rely on it. The department has acknowledged the need to change the way it operates to ensure that the state's infrastructure meets Tennessee's transportation needs now and in the future.

Our goal was to review the department's efforts to address its recently identified challenges in the areas of **workforce**, **congestion**, and **delivery** including the impact of **funding** for each of the challenge areas. Additionally, we reviewed the department's assertions about Tennessee's infrastructure needs and how management relies on information and data to implement new methods to improve the delivery and maintenance of transportation construction projects. See **Emerging Issue 1**, **Observation 1**, and **Observation 2**.

History of the Nation's Interstate Highway System and the Highway Trust Fund

The Interstate Highway System has been crucial to Tennessee's development. In the 1920s, Tennessee was known as a detour state since the mountains made it difficult for motorists and truckers to travel through safely. The construction of interstate highways not only brought jobs to Tennesseans but also connected over a third of Tennessee's 95 counties, creating a supportive environment for motorists and the trucking industry.

President Eisenhower signed the Federal-Aid Highway Act of 1956 to create a funding mechanism for the United States Interstate Highway System—the Highway Trust Fund—and coordinate the federal government's role in highway construction and maintenance. The Highway Trust Fund consists of a Highway account and a Mass Transit account, whose revenue sources stem from federal motor fuel taxes and sales taxes on heavy highway vehicles. In 1956, the federal motor fuel tax was 3 cents per gallon, 10% of the average cost of gas, which was 31 cents per gallon at that time. Over time, Congress has raised the gas tax, gradually stopping at the rate of 18.4 cents in 1993, 30 years ago.

A 2020 infrastructure funding report⁵ presented to the United States House Committee on Ways and Means, stated that since 2001, the Highway Trust Fund has spent more money than it receives on an annual basis. By law, the Highway Trust Fund cannot incur negative balances. As a result, monies from other funds, like the Treasury General Fund, were used to address the Highway Trust Fund shortfalls. The Congressional Budget Office projects that by fiscal year 2030, the yearly shortfalls from the Highway account will reach \$134 billion.

A 2019 report⁶ from the National Academies of Sciences, Engineering, and Medicine assessed that there is not enough revenue generated from the gas tax to fund the repairs of the foundations of the nation's interstate highway system. The 2019 report estimated a need for \$20 billion in additional funding per year for interstate repair to keep up with the yearly increase in vehicle miles traveled. To meet this need, Congress would have to increase the gas tax from 18.4 cents to nearly 30 cents per gallon, approximately a 39% increase. The Congressional Budget Office projected that if the gas tax had been indexed to inflation in 2015, the rates would be 31 cents per gallon.

Much of the interstate highway system is over 50 years old, and a large part of it needs to be rebuilt from the ground up.

—National Academies of Sciences, Engineering, and Medicine, 2019

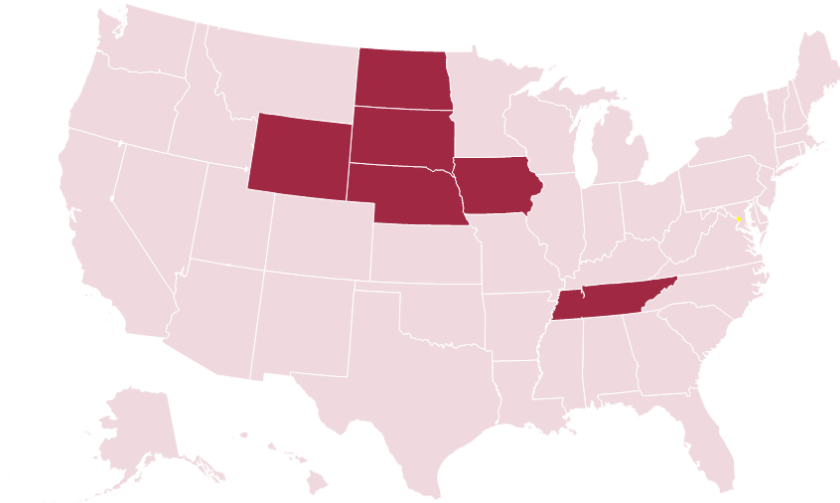
Original pay-as-you-go funding methodology for building the nation's interstate system

When President Eisenhower signed legislation to implement the interstate system, the law required a “pay-as-you-go” funding method. Under this method, states would not acquire debt to construct a roadway asset. Since the 1950's, many states have abandoned this method and, at times, have issued bonds to pay the initial cost of building a large roadway asset such as a parkway or multi-lane bridge. As of 2021, there are six states in the nation that pride themselves on remaining “pay-as-you-go” states, meaning they have no debt obligations from bonds used to finance new highway construction, as displayed in **Exhibit 8**. These states are North Dakota, South Dakota, Nebraska, Wyoming, Iowa, and Tennessee.

⁵ The report is titled “*Overview of Selected Provisions and Options Relating to Funding and Financing Infrastructure Investments*” prepared by the Staff of the Joint Committee on Taxation, on January 27, 2020.

⁶ The 2019 report is titled “*Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future.*”

Exhibit 8
States With No Highway Debt Bonds
As of 2021



Source: Created by the auditor based on annual highway debt data from the Federal Highway Administration.

Tennessee’s backlog of construction projects has continued to grow since 2014

Issues that affect the nation’s Interstate Highway System also affect Tennessee. The Interstate Highway System’s future is threatened by a growing backlog of projects and funding challenges. In 2015, the Tennessee Comptroller’s Office of Research and Education Accountability (OREA) released a report⁷ that stated that in 2014, the department reported a **backlog of construction projects totaling \$8.5 billion**. In 2017, the backlog **grew to \$11 billion**, and the state’s backlog of construction projects has continued to grow since 2017, **rising to \$26 billion in 2023**, as stated in the department’s 2023 Primer⁸ and illustrated in **Figure 3**.

**“We have a \$26 billion
backlog . . . and nowhere
near enough revenue to
get caught up.”**

—2023 Primer

As stated in the 2015 OREA report, “Current fuel tax rate increases are the most likely short-term solution to help meet near-term transportation needs.” As evidenced by the continual increases

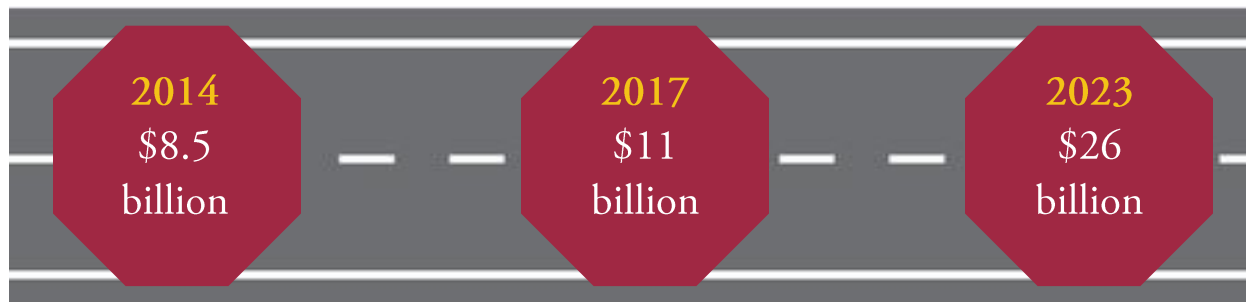
⁷ This OREA report is titled “*Tennessee Transportation Funding: Challenges and Options*” and was released in January 2015.

⁸ The department publishes an annual report that highlights the department’s goals and current affairs, called a Primer.

in the state's transportation project backlog, long-term options are necessary to ensure the state continues to prosper. The department acknowledges this on its Build with Us website⁹ by stating,

Tennessee's growth has far exceeded any projection developed during the 2017 IMPROVE Act push, and the [department] is falling behind on delivering the infrastructure solutions needed to support the volume of population moving to Tennessee.¹⁰

Figure 3
Tennessee's Growing Transportation Project Backlog



Source: *Department of Transportation Challenges and Solutions*, pages 2-3, and Offices of Research and Education Accountability: *Tennessee Transportation Funding: Challenges and Options* (2015), page ii.

Tennessee's traffic congestion has continued to increase

According to the U.S. Bureau of Transportation Statistics, in 2021, more than 75% of Tennessee citizens drove alone to work. Individual commuters and an increase in the state's population indicate more people travel the roadways, causing potential delays. Although many people think of the time they lose due to congestion, there are also monetary costs to motorists for this waste of fuel. According to the Texas A&M Transportation Institute, in 2019, **Nashville commuters experienced 66 hours of traffic delays per person.** For additional information, see **Appendix 8** for the cost of congestion measured by wasted gallons of fuel for southeastern states' urban areas.

In 2019, congestion cost
Nashville commuters an
average of
\$1,465
per person.

—Texas A&M
Transportation Institute

According to a study completed by Tennessee State University,¹¹ Tennessee has access to both national and international markets for multiple transportation modes. In the eastern part of the state,

⁹ The Build with Us website is one of the department's ways to communicate information to the public. The website contains general resources relating to the department's challenges and transportation initiatives.

¹⁰ *White Paper*, Build with Us (2023).

¹¹ *Evaluating Freight Intermodal Connectors (FICs) in Tennessee*, 2020.

Exhibit 9
2023 Top Truck Bottleneck Locations
Tennessee has 7 of the top 100
truck bottlenecks in the nation

-  9. Nashville: I-24/I-40 at I-440 (East)
-  37. Nashville: I-40 at I-65 (East)
-  39. Chattanooga: I-24 at US 27
-  51. Nashville: I-65 at I-24
-  59. Chattanooga: I-75 at I-24
-  63. Knoxville: I-40/I-75 at I-140
-  72. Knoxville: I-40 at I-275

Source: American Transportation Research Institute, Top 100 Bottlenecks 2023.

three interstates pass through the region creating one of the country's highest truck volume areas and making Tennessee a popular state for manufacturing and freight movement.

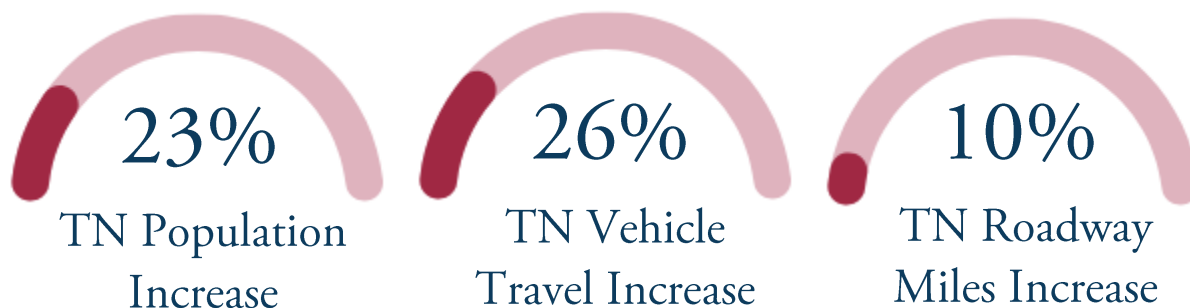
According to the American Transportation Research Institute's (ATRI) analysis of truck GPS data for all weekdays for the period January 1, 2022, through December 31, 2022, **Tennessee has 7 of the top 100 bottleneck locations across the United States**, as shown in **Exhibit 9**. These locations represent a localized constriction of traffic flow that can cause reduced speeds and delays. While many locations may experience increased levels of congestion due to impacting events such as traffic accidents, the difference is that bottlenecks are locations that experience recurring congestion.

Tennessee's transportation system is important to the state's citizens and the state economy

Each day, citizens and visitors of the state rely upon roads, bridges, and air travel. A well-designed and maintained transportation system is crucial to the success of the state. Between 2000 and 2021, **Tennessee road usage increased by almost 17 billion miles**, and the **population increased by almost 1.3 million residents**.¹² Although both the population and miles traveled have increased by more than 20%, as shown in **Figure 4**, Tennessee has only seen a 10% increase in miles of new roadway construction. This indicates that the state's infrastructure is seeing more use and greater traffic flow, which result in increased wear and tear and more frequent maintenance.

¹² Population data from the U.S. Census Bureau and roadway miles by state and vehicle miles traveled data from the Federal Highway Administration and Bureau of Transportation Statistics.

Figure 4
Tennessee Growth Statistics for
2000 Through 2021

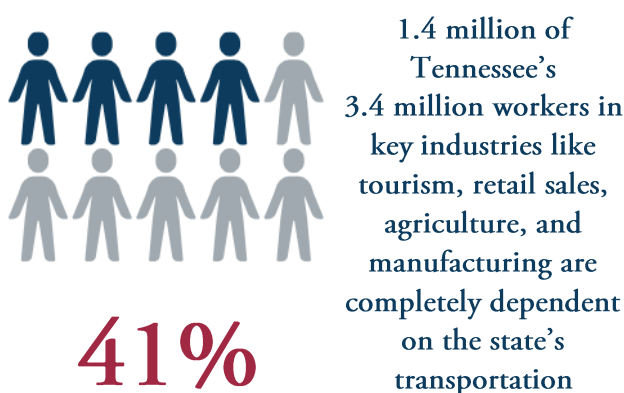


Source: Created by auditor using population data from the U.S. Census Bureau and roadway miles by state and vehicle miles traveled data from the Federal Highway Administration.

In addition, with the state's emphasis on tourism, ensuring that Tennessee's transportation system supports these out-of-state visitors is critical to its mission of supporting economic growth. In 2021, the Department of Tourist Development reported that travelers spent \$66 million daily in the

state, a 44% increase from 2020. Tourist Development also stated that all 95 counties in the state saw an increase in visitor spending in 2021. According to TRIP, the Tennessee transportation system's design, construction, and maintenance supports approximately 72,000 jobs throughout the state, with jobs in industries like tourism and manufacturing being extremely reliant on the state's transportation network, as shown in Exhibit 10.¹³ The system must move people and goods effectively to meet the department's mission as state roads, interstates, and highways are the primary means to move people and goods across the United States.

Exhibit 10
Transportation Network Dependent Jobs



Source: TRIP: a private, nonprofit organization that researches, evaluates, and distributes economic and technical data on surface transportation issues. TRIP published this information in July 2023.

¹³ TRIP used the most recent information available from the following sources: U.S. Census Bureau, U.S. Department of Transportation, Bureau of Transportation Statistics, National Highway Traffic Safety Administration, American Road and Transportation Builders Association, and the American Automobile Association (AAA).

The Federal Highway Administration expects freight movement to increase substantially by 2045

The Federal Highway Administration's *Freight Mobility Trends Report 2019* explains that the tons of freight moved throughout the United States will increase by 37% between 2018 and 2045. Additionally, long-haul freight truck miles per day are expected to increase by 60% in that time frame. Long-haul freight truck traffic is concentrated on major routes connecting metropolitan areas, ports, and border crossings; with the projected growth, the nation's highways will continue to experience even greater demand. These projected increases mean that already congested routes are likely to face increased levels of congestion and delays. Because **highways** are an **integral element of the national multimodal freight transportation system**, Tennessee must ensure its transportation network meets both national and state expectations to keep the economy strong and to promote the livelihoods of all citizens. The department must ensure its goals and priorities align with its mission to provide a safe transportation system that supports economic growth and quality of life.

At the department's 2023 – 2024 budget hearing on November 9, 2022, management explained that **historical approaches to managing the state's transportation system were no longer effective**. Management cited three major challenge areas in meeting its mission:

Workforce

20% vacancy rate as of
2022



Congestion

\$26 billion project backlog



Delivery

Projects take 15 years
on average to complete



Tennessee's state agencies are statutorily required to complete strategic plans and Customer Focused Government plans to formalize their goals and objectives in fulfilling their mission

Each state agency is required¹⁴ to develop a supplementary Customer Focused Government plan each year, which supports an entity's overall strategic plan and includes key performance measures to track and monitor overall operations. A state agency's overall strategic plan and annual Customer Focused Government plans should help guide the agency toward meeting their mission by setting long-term overarching goals and short-term operational goals that track and monitor the agency's performance. The department identified four goals and eight strategic initiatives in its fiscal year 2023

¹⁴ See Section 9-4-5602, *Tennessee Code Annotated*.

Customer Focused Government plan, with three of the goals specific to management’s plan to address the department’s identified challenges.

Workforce Challenges

The department’s workforce provides the critical services fundamental to the department’s mission

Employees are integral to a department’s performance and mission since they are key to achieving the day-to-day tasks. Management has identified its workforce as a major challenge impacting current and future goals. Alongside its strategic plan, the department developed a **strategic initiative** in its fiscal year 2023 Customer Focused Government plan related to its workforce challenge. Management plans to complete the first phase of its Empowering People Influencing Culture (EPIC) restructuring initiative to encourage innovation and improvement while eliminating redundant tasks.

In November 2022, management reported a 20% vacancy rate for its authorized positions and experienced increased turnover during the same period

As shown in **Table 7**, as of November 11, 2022, the department reported that it was facing continual issues with hiring (filling the vacancies) and retaining employees. With a 20% vacancy rate, management’s ability to fulfill the department’s mission and goals will be more difficult. Additionally, although department management explained that in previous years the department’s turnover rate was around 10-12%, management has recently experienced a dramatic increase in turnover for fiscal year 2022, with the rate at 20% for that fiscal year. According to management, employee turnover is attributed to employees frequently leaving for higher-paying opportunities.

Table 7
Department Turnover Data
For the Period July 1, 2019, through June 30, 2023

Year	2020	2021	2022	2023
Percentage	13%	14%	20%	21%

Source: Calculated by auditors with data from Edison, the state’s enterprise resource management system.

Based on interviews we conducted with management, the department’s high turnover rate has resulted in several vacant positions for extended periods of time, and current employees must take on the responsibilities of those vacant positions while also managing their own responsibilities. As such, management has the challenge to fill their vacancies while also retaining current staff.

Technician positions are critical for achieving the department's mission and represent the most common job within the department

As part of our review of the department's staffing data, we noted that the department's **Technicians and Operations Technicians** accounted for **42%** of all available positions, as of January 26, 2023. Similarly, Technician vacancies also accounted for **43%** of all vacant positions within the department. Because these positions are shared across the department's four regions, we wanted to determine if any region had more vacant positions. We determined that Region 3 has the highest rate of vacant Technician positions, at almost 50% unfilled, followed by Regions 2 and 4, as shown in Table 8.

Table 8
Vacancy of Technicians Position
by Region As of January 26, 2023

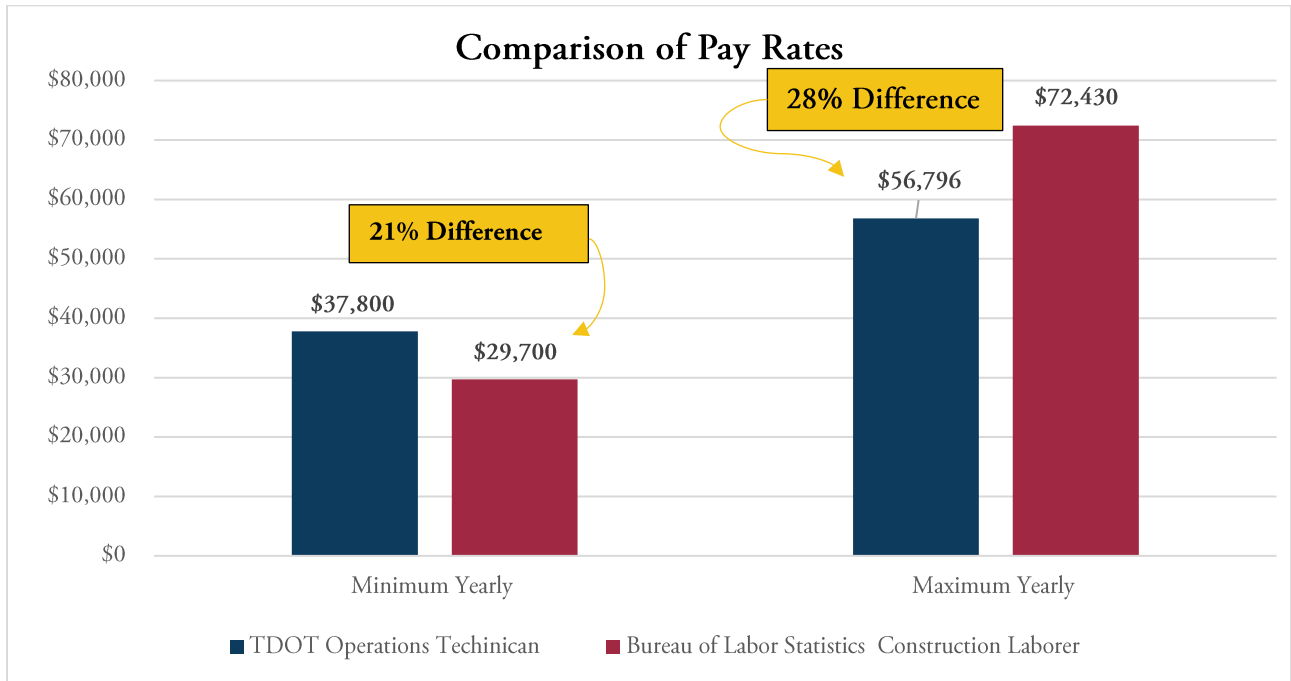
Region	Vacancy Percentage
Region 1 (Knoxville)	4%
Region 2 (Chattanooga)	28%
Region 3 (Nashville)	45%
Region 4 (Memphis)	26%

Source: Created by the auditor based on staffing data from Edison, the state's enterprise resource management system.

Management states that most employees leave the department to seek higher paying jobs

Department management stated that employees most often leave because market pay is 10-15% higher than the department's compensation levels as of January 2023. The Bureau of Labor Statistics (BLS) reported that nationally, Construction Laborers who earn the highest reported wages, are paid \$72,430 a year, almost 30% more than the maximum pay for department Technicians. **Graph 2** shows a comparison of compensation levels between Construction Laborers and the closest equivalent Technician position in the department.

Graph 2
Compensation Rates



Source: Created by the auditor based on data from the U.S. Bureau of Labor Statistics and Edison, the state's enterprise resource management system.

Graph 2 demonstrates that the maximum yearly pay for a department Technician is approximately \$15,000 below that of the highest paid Construction Laborers, a difference of 28%. **Graph 2** also shows a 21% difference in the minimum pay of a Technician; the department pays approximately \$8,000 more in comparison to the U.S. Bureau of Labor Statistics data.

The department raised salaries for 1,200 employees as of February 1, 2023

Management has taken steps to raise the pay of the department employees' compensation to be more competitive with the market. Management studied wages in local areas like Metro Nashville, as well as in other states such as Texas, North Carolina, Georgia, Florida, and Arkansas to obtain a better understanding of what the respective regions and states were paying for various positions. To gain a better understanding of what nearby cities and states were paying, the department reviewed salary surveys conducted by the American Association of State Highway and Transportation Officials (AASHTO), which compiled salary data from across the country to form comparisons between several positions in each participating state. Then the department worked with Deloitte¹⁵ to complete a market analysis as the department began implementing the Empowering People Influencing Culture (EPIC) initiative with new job classifications. Management used this information to determine the new

¹⁵ Deloitte provides audit and assurance, tax and legal, consulting financial advisory, and risk advisory services to various businesses.

compensation levels for employees, as well as form the new job classifications that align with the state's standard compensation plan.

As of February 1, 2023, the department eliminated 500 vacant positions as a part of the restructuring process, which allowed it to allocate approximately \$34 million to increase employee pay. On that same day, the department adjusted the salaries of 1,200 department employees, primarily **Operations Technicians** and related positions, to the increased rates. The position of department Operations Technician saw a pay increase of approximately \$335 per month, or \$4,019 per year. Management explained that the remaining adjustments were forthcoming as the department continues to implement EPIC.

Pay increases help the department be more competitive in the job market

With the salary increase, the minimum pay for department **Operations Technicians** increased to \$42,924. This amount is approximately \$13,000 more than the minimum pay for Construction Laborers and puts the minimum pay for Operations Technicians higher than the lowest-paid Construction Laborers. **As of May 2023, the department Operations Technicians' pay, on average, was approximately \$43,000 a year.** According to the U.S. Bureau of Labor Statistics, the average yearly wage for Construction Laborers in all industries in May 2022 was \$46,350, as shown in **Table 9**. When comparing department Technician average wages with the annual average wages of Construction Laborers, the department's Operations Technicians **are still about \$12,000 below** "Highway, street, and bridge construction" laborers.

Table 9
Annual Average Wages for Construction Laborers
by Construction Industry, May 2022

Industry	Annual Average Wage
Highway, street, and bridge construction	\$55,160
Other heavy and civil engineering construction	\$50,180
Nonresidential building construction	\$49,770
All industries	\$46,350

Source: Created by Auditor based on data from the U.S. Bureau of Labor Statistics.

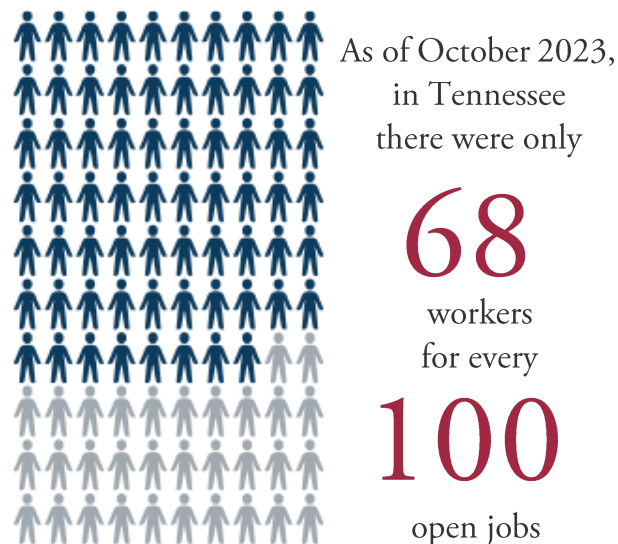
According to the U.S. Chamber of Commerce, Tennessee has only 68 available workers for every 100 open jobs, as shown in **Figure 5**. This represents a surplus of job openings and not enough workers to fill them across the state in many industries. The Assistant Chief of Administration/Human

Resources Director explained that while every division within the department has vacancies, **Technicians**¹⁶ represent the most vacant positions.

The department launched the **Empowering People Influencing Culture (EPIC)** initiative to address staffing issues

Management designed EPIC to address several issues, including the classification of employees and titles, the pay rate of various positions, the department's overall culture, and to increase the span of control.¹⁷ EPIC was enacted to establish the organizational structure needed to make the department's Integrated Program Delivery (IPD) implementation successful. As of July 2023, management is implementing EPIC in the Bureau of Engineering, which makes up around 80% of the department's workforce. Management has been hosting EPIC business meetings and created an EPIC Academy course for employees to shift the department's culture to one of accomplishment that supports the department's vision. Both events help inform staff about changes from the EPIC initiative and answer their questions. Management also maintains a Restructuring Status Tracker spreadsheet to assist with monitoring EPIC's progress.

Figure 5
Tennessee Employment



Source: The U.S. Chamber of Commerce.



In the next sunset audit, we will review the department's implementation of EPIC to determine if this initiative helped address the department's staffing challenges.

¹⁶ According to department management, **technician** responsibilities include operating roadway equipment, conducting material tests, taking and preserving samples, as well as performing geometric and algebraic calculations. Applicants must have a high school diploma or equivalent and a valid, non-commercial driver's license.

¹⁷ The span of control is the number of direct reports that a supervisor is assigned. By increasing the span of control, a manager will have more direct reports.

Congestion Challenges

Tennessee’s growth in population is far outpacing the increases in roadway miles throughout the state

The increase in vehicles on our roadways without a significant increase in road miles has led to more congestion on roads across the state. A key operational goal in the department’s fiscal year 2023 Customer Focused Government plan is related to improving congestion statewide in both rural and urban areas. One target metric is to ensure interstate and non-interstate travel time is reliable and safe. Additionally, the department has a target metric to minimize excessive delays in each of its four urban areas (Memphis, Nashville, Chattanooga, and Knoxville).

Tennessee needs at least \$26 billion to address urban and rural congestion

Management estimates that \$26 billion is needed to address congestion issues. According to a 2022 congestion study issued by the department, Tennessee’s four major cities alone need approximately \$17.5 billion to address their urban congestion needs. The study used data from 2021 to develop its cost estimate, and the estimate does not account for inflation. Without addressing these needs, the department estimates that the public’s commute time between larger cities will increase significantly by 2045.

Management plans to address the state’s rural congestion needs by widening and adding lanes to approximately 708 miles of rural area roads. Department management provided an estimated cost of \$17.5 million per mile of rural area road, totaling approximately \$12.4 billion. This is not the first time the department has recognized the need for projects to reduce congestion. The IMPROVE Act included some projects, such as widening I-65 between Nashville and the Kentucky state line, that would address congestion-related issues. The department’s total congestion estimate includes the \$3.6 billion of projects to improve congestion included as part of the IMPROVE Act, as shown in Exhibit 11.

Management is studying urban congestion with traffic management technology, like the I-24 SMART Corridor project, and Public-Private Partnerships, like choice lanes, to

Exhibit 11	
Statewide Congestion Needs for 2023	
Urban Congestion	\$17.5 Billion
Rural Congestion	\$12.4 Billion
Congestion Total	\$29.9 Billion
IMPROVE Act Projects	\$3.6 Billion
Statewide Congestion Needs	\$26 Billion

Source: The Tennessee Department of Transportation’s Fiscal Year 2023-2024 Budget Hearing presentation.

increase road capacity. Choice lanes are additional lanes motorists can use for a fee that aim to provide a guaranteed travel speed of 50 miles per hour by operating on a dynamic pricing structure. This is discussed in more detail in the **Emerging Issue** below.

Emerging Issue 1

Choice lanes are the department's main solution to address urban congestion, which will require extensive planning and oversight to identify and respond to new risks

Choice lanes are fee driven and paid by motorists who choose to take advantage of the additional lanes. According to department management, Georgia's choice lanes decreased rush hour traffic by one hour, and general-purpose lane speed improved by up to 20 miles per hour. Texas choice lanes (TEXpress) cite a 72% reduction in overall congestion after the introduction of choice lanes and an increase in travel speeds of 10%. Although choice lanes have seen success in other states, there are risks presented to the state, such as funding, cost of maintenance, and long-term contracts.

The Transportation Modernization Act (TMA) grants the department authority to develop choice lanes

The department must develop choice lane projects, referred to as user fee facilities¹⁸ in the TMA, in accordance with regulations outlined. According to the TMA:

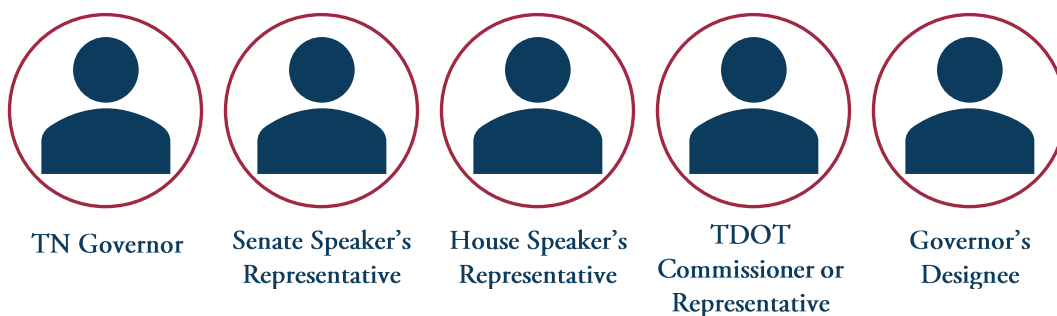
- the creation of choice lanes must be in accordance with the department's long-range statewide transportation plan (Section 54-3-102[b]);
- the department must consider the economic, social, and environmental impacts of a choice lane project (Section 54-3-102[d]);
- the development of a choice lane project is subject to public hearings (Section 54-3-102[e]);
- with respect to choice lane contracts, a private entity is allowed to lease a lane on the state highway system but is not allowed to own a lane or lanes on the state highway system (Section 54-3-106 [b]);

¹⁸ According to the Transportation Modernization Act, Section 54-3-104, *Tennessee Code Annotated*, "the department may develop user fee facility projects and operate user fee facilities as provided in this chapter." Section 54-3-103 defines user fee facilities as "a facility where the development or operation of the facility is wholly or partially funded with user fees." A facility is defined as "a highway, bridge, tunnel, parking lot or garage, or other private entity or other paved surface or structure that is designed to carry or contain land transportation vehicles, or another transportation-related facility."

- the department must not enter into choice lane agreements with a person or entity appearing on a sanctions list published under the authority of the U.S. Department of Treasury, Office of Foreign Assets Control (Section 54-3-106[c]); and
- to establish new choice lane projects or add choice lanes to an existing interstate, the department needs to submit a proposal to the Transportation Modernization Board (Section 54-3-104).

The TMA provided for the creation of the Transportation Modernization Board¹⁹ (TMB) to oversee the creation and modifications of the user fee pricing structure. See **Figure 6**.

Figure 6
Transportation Modernization Board



Source: Created by auditor based upon the Transportation Modernization Act.

The TMB must approve:

- the department's proposal for choice lane projects (Section 54-3-104[d]);
- the designation of one or more lanes or portion of highway for choice lanes (Section 54-3-104[c]);
- setting user fees, or the method used for setting variable user fees (Section 54-3-104[e]); and
- the administrative fees and procedures for the collection of unpaid user fees (Section 54-3-114[d]).

As allowed by the TMA, the choice lane company would use the choice lane user fees to reimburse themselves for the initial investment and cost of construction of the choice lane that the company assumed. The Commissioner has stated there will be a revenue threshold the state will share in as part of the choice lane user fee revenue. Revenue from the choice lanes will revert to the State

¹⁹ According to Section 4-29-246(a)(56), *Tennessee Code Annotated*, the Transportation Modernization Board is scheduled to sunset on June 30, 2025.

User Fee Fund as stated by Section 54-3-105(b), *Tennessee Code Annotated*, and may be used for activities outlined in that statute.

As of October 10, 2023, and according to management, the Governor and Speakers of the House and Senate are reviewing prospective candidates and have not yet filled the positions.

Choice lane pricing structures and choice lane funding methods can vary by state

The choice lane user fee has a dynamic pricing structure, which increases as the congestion level increases, as shown in **Figure 7**. Choice lanes differ from traditional toll roads because their use is completely optional. With a toll road, every vehicle must pay to enter the roadway or cross the toll bridge. With choice lanes, general-purpose lanes still exist that are free to use, and drivers have the choice of which lane to use. Proponents of choice lanes claim that the principles of supply and demand regulate the pricing for the lane because drivers are not likely to use the choice lane when general-purpose lanes are moving at normal speeds, thus decreasing the price to use the lane. For examples of other states' choice lane pricing and funding sources, see **Appendix 9**.

Figure 7
TEXpress Lane Pricing

During our review of the LBJ
TEXpress Lane, we saw
lane prices range from

\$6.22 to \$27.20

Source: <https://www.texpresslanes.com/pricing/average-rates/>

Department management has multiple factors and options to consider when negotiating a long-term choice lane contract

Department management explained that choice lane contracts are not a “one-size-fits-all” approach but instead a complex and negotiable document. Based upon our review of choice lane contracts in other states, there are many terms in these contracts that all parties must understand and carefully negotiate to ensure that the state has included provisions to protect its interest in the asset and in the public investment. As shown in **Figure 8**, we highlighted what the Federal Highway Administration determined as innovations and features for the different states. Specifically, we noted that these operation and maintenance contracts between a state transportation department and the choice lane company are typically long-term contracts that often last for longer than 50 years, as shown in **Figure 9**. This means that the decisions made by department management and state leadership should be fully evaluated to ensure the state’s best interest now and for many years in the future. See **Appendix 9** for more information about choice lanes in Georgia, Virginia, North Carolina, and Texas.

Figure 8
Innovations and Features Determined by the Federal Highway Administration

North Carolina: I-77 Express

- Cost \$30 million less than if the state built the project
- North Carolina DOT was able to address projects in that corridor 20 years sooner
- Choice lane user fees pay for the P3 company's maintenance of general-purpose and choice lanes
- 3 years to construct

Georgia: NW Corridor

- Joint project between Georgia DOT and the State Road and Tollway Authority
- The state operates and maintains the lanes
- Registered transit vehicles do not pay fees to use the choice lanes
- 4 years to construct

Texas: LBJ Express

- One of the most comprehensive choice lane systems in the country
- Innovative construction techniques led to significant cost savings
- North Texas Tollway Authority collects the user fees
- 4 years to construct

Virginia: I-95 Express

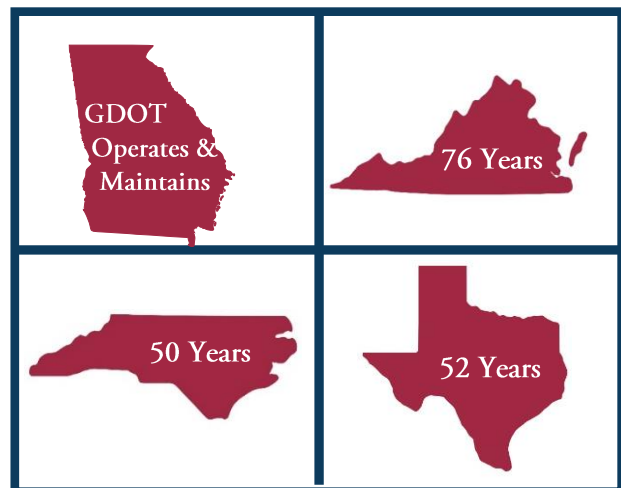
- Addresses congestion at the “worst traffic hotspot” in the nation
- Connects to the Interstate-495 Express Lanes system
- The state contracted to have the lanes operated and maintained until 2087
- 3.5 years to construct

Source: Created by auditor based upon data from the Federal Highway Administration's Center for Innovative Finance Support: Project Profiles database.

On June 8, 2023, we met with department management to discuss management's plans after the TMA was passed

According to management, the department is in the process of conducting a choice lane feasibility assessment in a collaborative effort with industry professionals, including economists, choice lane consultants, traffic operations specialists, legal and procurement specialists, and engineers. Department management is assessing where choice lanes would benefit commuters most through traffic and revenue studies and expects to have data from the consultant in November 2023. Management gave the example of a choice lane from Murfreesboro to Nashville as too difficult to complete. Instead, choice lanes in certain sections of this route would be better to alleviate congestion and are more feasible to construct. Even though management is assessing the feasibility of choice lanes in Memphis, Nashville, Chattanooga, and Knoxville, the studies may

Figure 9
Operation and Maintenance
Contract Length by State



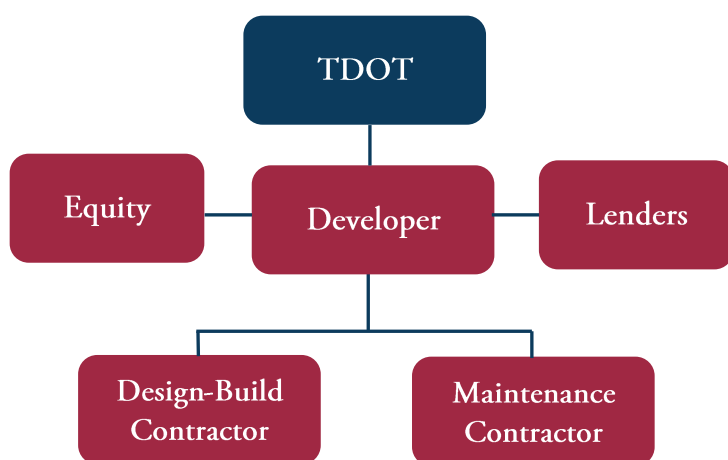
Source: Created by the auditor based on data from the Federal Highway Administration.

determine that choice lanes are not the best solution for a particular area. Department management plans to provide the legislature with a report on these assessments and studies on December 1, 2023.

Choice lanes are a significant change to the state's transportation system and how it serves citizens and visitors

Public Private Partnerships (P3s) are an alternative delivery method that the department has not previously used where the state forms a contractual agreement with a private entity that allows for

Figure 10
P3 Organizational Structure



greater private participation in the delivery of projects. These agreements are typically for private companies to help design, build, finance, operate, and maintain infrastructure projects (see Figure 10). The advantage of this method is that contracts have greater variability and may provide less costly funding methods to the state. The key distinction between P3s and other delivery methods is that the private company invests some of its money in the project. **The department intends to utilize P3s to complete the choice lanes initiative.**

Source: TDOT Build with Us: Congestion, Fact Sheet.

The department's desire to bring choice lanes to Tennessee presents an opportunity to reduce congestion but may also present new risks since the state has not previously engaged in these types of contracts. Department management should use its research on the successes and failures from other states and work alongside the TMB to develop the most effective choice lane contract for each viable choice lane location in Tennessee.

Management's Comment

We concur. In response to moving forward with the implementation of choice lanes, TDOT has and continues to assemble professional services in three key areas: technical, legal, and financial. The department will be working with these experts, which specialize in choice lanes and public-private-partnerships (P3) arrangements. Additionally, as called for in the Transportation Modernization Act (TMA), the creation of a Transportation Modernization Board (TMB) to oversee choice lane projects. TDOT is working with the Governor's office and Speakers of the Senate and House on affirming member appointments as called for in statute. In preparation for the commencement of the board, TDOT is currently drafting bylaws for the board, creating a website for public notice and resources, and developing training and educational materials for board members and the public.



In the next sunset audit, we will review the department's status of implementing choice lanes in Tennessee.

Delivery Challenges

One of the department's goals in its 2023 Customer Focused Government plan is to deliver projects on schedule and within budget. With the department's goals in mind, we reviewed selected parts of the construction process that relate to ensuring the department completes projects on time and within budget.

To support the Governor's priority of transparent and efficient government, the department's first goal in its fiscal year 2023 Customer Focused Government plan is related to **project delivery** and is to deliver transportation projects **on schedule and within budget**. To achieve this goal, management plans to

- increase the percentage of construction projects completed by the original contract completion date or a department-approved extension date;
- ensure the average percent difference between the final project cost and the contract award is within 8%; and
- increase the number of construction projects on the 3-year plan that are completed within the fiscal year.

The department uses long-term and short-term plans to prioritize construction projects for the state

As required by federal statute, department management begins all planning processes by creating a 25-Year Long-Range Transportation Policy Plan. The purpose of this plan is to set a strategic vision for the transportation system for the long-term future. Every four years, management updates the Statewide Transportation Improvement Program (STIP), which includes all transportation projects proposed for federal funding or projects considered regionally significant. Management must identify the need for statewide transportation construction projects on the state's STIP to receive federal project funds. As part of the STIP, management and staff look at various metrics, such as safety, population, and miles traveled, to prioritize projects. Management uses the prioritized list of projects on the STIP to determine the best projects to perform in the short-term future as it creates its Comprehensive Three-Year Multimodal Improvement Program, also known as the Three-Year Plan.

The department uses a variety of methods to deliver construction projects

The department’s “traditional” **Design-Bid-Build** method consists of the department staff having full responsibility for project design plans and for completing all preconstruction phases of a project. Alternative delivery methods,²⁰ which include **Construction Manager/General Contractor**²¹ (CM/GC), **Design-Build**²² (DB), and **Public-Private Partnerships** (P3), shift risk from the department to the private sector. Under the **CM/GC method**, the department retains a contractor to provide insight and input during the design phase, although the department contracts separately with the designer and contractor. The **DB method** consists of the department executing one contract with a contractor for all design and construction services. See **Appendix 10** for more information about traditional and alternative project delivery methods.

Historically, it took the department, on average, 15 years to complete a new construction project

Management determined that historical operations were not effective for the modern transportation system’s needs and that the department must reduce the project delivery time, as shown in **Figure 11**. Historically, the department operated in an assembly line structure that limits when another division can begin work on project tasks, as shown in **Figure 12**. In part because certain preconstruction activities, such as court proceedings to acquire land or the discovery of an endangered species, take longer or can cause delays due to complications. This linear structure required each division to fully complete its portion of work before the next division could begin its work on a project; management has referred to this as “working in silos.” Each division focused on its section of the project and communicated very little with other divisions.



Source: The Tennessee Department of Transportation’s Fiscal Year 2023-2024 Budget Hearing presentation.

²⁰ The Transportation Modernization Act authorizes the department to use the **Progressive Design Builder** (PDB) alternative delivery method. As of June 2023, the department has not used this method and did not have any projects that would use this method.

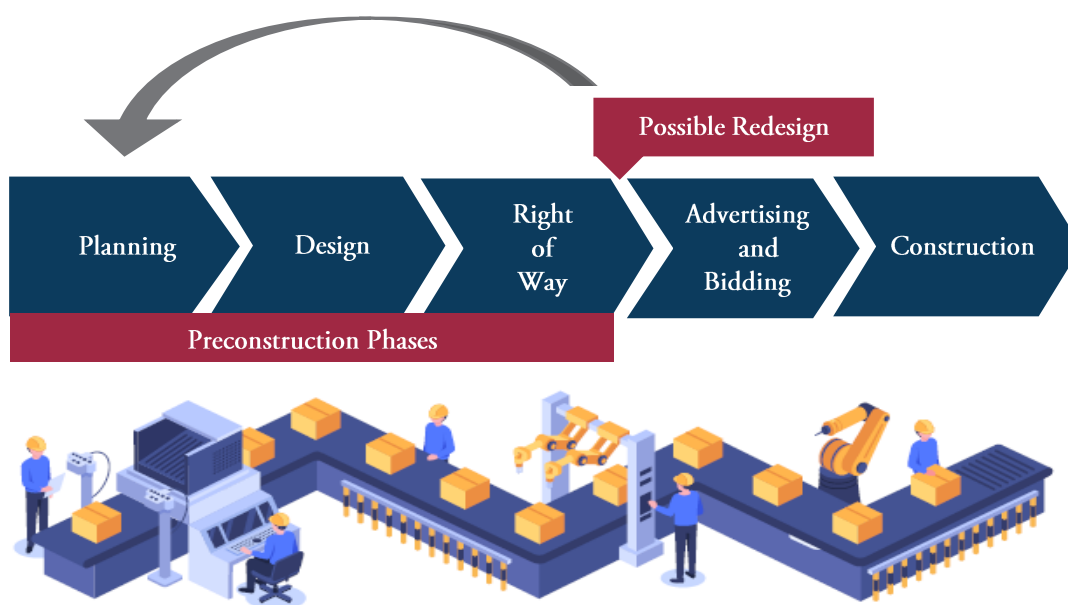
²¹ *Tennessee Code Annotated* has authorized the department to use CM/GC contracts since 2013.

²² *Tennessee Code Annotated* has authorized the department to use Design-Build contracts since 2007.

Integrated Program Delivery (IPD) changes the department's style of operations and shifts the preconstruction development phases to a matrix approach to improve communication across all divisions

The goal of IPD is to improve communication within the department to help better plan a project's design and maintenance requirements during the preconstruction phase.²³ For example, early input from the maintenance division could identify aspects of the project's design that would be incredibly costly to maintain over time. Because the maintenance division provided input early in the project's development, engineers can incorporate design changes as they create design plans instead of completing the plans and then receiving maintenance input.

Figure 12
Traditional Delivery Project Structure



Source: The department's "Challenges and Solutions" presentation on their Build with Us website.

To help projects stay on track, a project manager, who is responsible for monitoring progress and ensuring projects are ready for bid letting by their assigned date, will lead the process, which implements multiple budget and schedule checks. The department is using IPD on 19 "pilot projects" to assess how effective the method is and identify any weaknesses. Included in these projects are the transportation and infrastructure projects to support BlueOval City. See **Appendix 11** for more information. **As of September 2023, the department has not yet completed a project using the IPD method and does not anticipate full implementation of IPD until 2026.**

²³ Preconstruction stages include securing funding, conducting planning and environmental studies, designing the project, and acquiring land.



In the next sunset audit, we will review the department’s implementation of IPD to determine if this new method helped the department shorten the time spent in the preconstruction phase.

Cost Estimating, Change Orders, and Cost Savings

While there are many processes in the department’s delivery of construction projects, we focused our work on processes that help ensure projects are completed on time and within budget, and to help ensure the data needed is available for analysis and reporting. **We determined that the most significant factors affecting both time and cost are cost estimating and change orders. We also reviewed how management analyzes and reports cost savings for alternative delivery projects.** We reviewed the department’s change order process, analyzed the length of time spent in construction for projects completed during our audit scope, and reviewed how the department calculated alternative delivery method cost savings.

The department completes full cost estimates for projects and requires formal requests for any changes to the original contract

Before the department can begin constructing the project, management must ensure an estimate of the project’s expected construction cost is complete. This estimate is important because state and federal law requires the department to accept the lowest reasonable bid. Management collects average unit cost information from all bids submitted by contractors and tracks this data in its Average Unit Price database and then calculates its estimates based on these averages. Contractors submit their costs to complete a project and sign a contract for the number of days to complete and the total cost.

The Department’s Goal:
Keep the average difference
between the final project cost
and the contract award within
8%

—2023 Customer Focused
Government Plan

Once construction begins, any change that alters the project’s completion date or total cost goes through the department’s change order process for approval before the change can be made. The completed change order serves as documentation for an amendment to the contract. Management classifies change orders by the dollar amount the modifications will cost and/or the number of additional days required to complete the project. Department staff must review and approve change orders in accordance with the department’s Policy 355-01.²⁴ Management explained that, while the

goal is to minimize change orders, the department will never completely eliminate the need for these

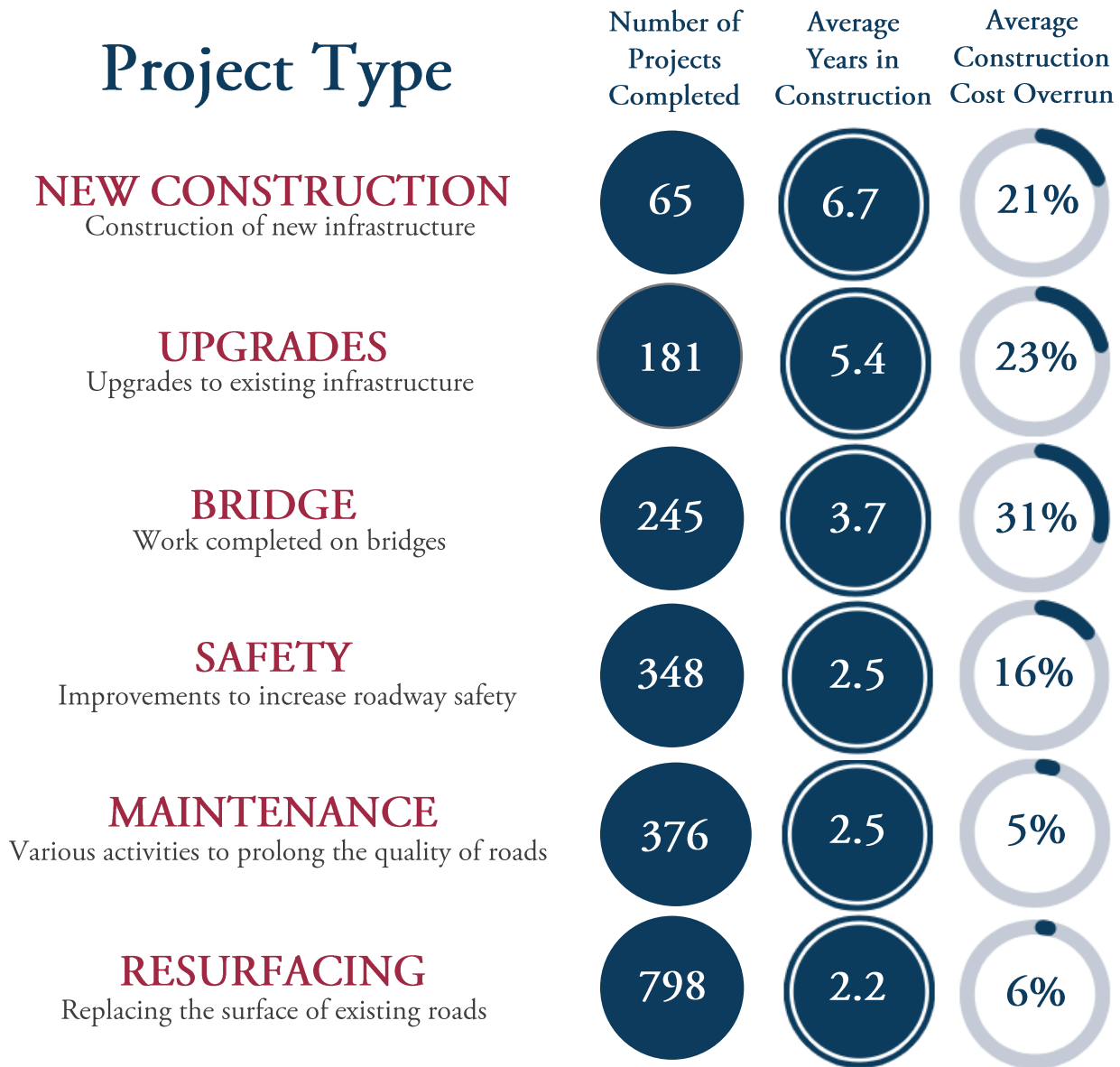
²⁴ Policy 355-01 for change order “Approval of Construction Change Orders and Force Account Work.”

documents. Management also permits contractors to extend completion dates for “excusable events.”²⁵ These are circumstances out of the contractor’s control, such as a natural disaster or delay caused by a utility company.

Additionally, the department’s contracts contain fixed unit prices, which prevent contractors from charging for more materials than specified in the contract. If the department or contractor identifies design deficiencies, a change order must be submitted and approved by the department before the project’s design plans can be changed and any additional costs related to those changes are allowed. The total amount of cost increases to a project during construction is called the cost overrun. See **Figure 13** for the average cost overruns on all projects (traditional and alternative delivery) for which the department completed the construction phase during our audit period.

²⁵ See the department’s 2021 *Standard Specifications for Road and Bridge Construction*, for further information about excusable events.

Figure 13
Completed Projects
For the Period July 1, 2019, Through January 29, 2023



Source: Created by auditor based on completed construction project data from the department's PPRM system.

Observation 1

Management should ensure full transparency when sharing project cost savings data with stakeholders

A 2011 top-to-bottom review of the department identified quality issues with project design plans that caused project delays and an increased number of change orders needed to complete projects

In addition to identifying quality issues, the 2011 top-to-bottom review highlighted the need for department management and staff to have relevant and useful data that is readily available for analysis. During our audit scope period, management authorized **2,049 change orders**. Projects that took longer to construct and had the highest total costs also had the largest percentage of average cost overruns. In our work, we noted projects that exceeded the department's 8% goal for the average difference between the final project cost and the contract award. This indicates that either management's cost estimates were not accurately predicted, or their design plans lacked critical elements that were subsequently identified during construction, as discussed further in the **Funding Challenge – Observation 2**. Readily available information would enable the department to use change order data to identify items such as individual project trends or projects with an abnormally high number of change orders. Management could also use change order data to track the performance of contractors and design consultants. If management has data suggesting poor performance by the contractor or the design consultant, management can better monitor contractor/consultant performance or forego doing business altogether.

Subsequent to our audit fieldwork, management provided documentation that they were tracking multiple aspects of change order data to identify project trends, and management told us that they are evaluating change orders by individual project.

Management has not established full transparency for cost and time savings for each delivery method

The department's 2023 Primer states, "To date, TDOT's alternative delivery program has seen a **\$22M cost savings and almost 70% faster delivery** compared to traditional delivery projects." The department regularly cited these savings by using **alternative delivery methods over traditional delivery** in public communications and on their Build With Us website. Management explained that the methodology for selecting the projects that are similar for comparison is based on the department's technical expertise and professional judgment because every project has unique factors affecting cost and time to complete.

We reviewed the underlying support for the cost savings calculations and determined that the three Design Build method projects were not comparable because they had wide ranges in factors such as lane miles, duration to completion, and costs. See **Appendix 10** for more information about

traditional and alternative project delivery methods. Additionally, according to management, comparisons between the Design-Bid-Build (traditional) and Construction Manager/General Contractor methods are not straightforward due to differences in the optimization of construction and reductions in risk. **Because alternative delivery projects and traditional delivery projects have different timelines and risk, the two methods are difficult to compare.** In its own studies, the Federal Highway Administration has recognized this by adding a disclaimer stating:

... agencies must realize that the results shown in this TechBrief are based on average performance from many projects. Any single project can perform substantially better or worse than the average. Contracting methods provide the environment for success, but they by no means guarantee it.

Management reported that between 2004 and 2022, the department completed **14 alternative delivery projects, compared to 6,927 traditional delivery projects.** With such a small number of alternative delivery projects completed, management should consider when they have sufficient comparable costs from the new alternative delivery projects to effectively compare cost savings between the alternate and traditional delivery methods. According to Green Book, to achieve transparency the department has the responsibility to provide the public with information that is “reasonably free from error and bias and faithfully represent what they [claim] to represent.”²⁶

Recommendation

Change Orders

We recommend that management track change orders in such a way as to allow the department to better analyze both time and cost overruns to help ensure more projects meet the department’s goals.

Alternative Delivery Cost Savings

While we did determine that alternative delivery methods can potentially save the department time in project delivery, we recommend that management add a disclaimer or include additional information on how they completed cost-savings calculations to avoid potential confusion or misunderstanding.

²⁶ According to Green Book Principle 13.04.

Management's Comment

We concur. Readily available information would enable the department to use change order data to identify items such as project trends or projects with an abnormally high number of change orders. The current change order databases can generate a great deal of information and create comprehensive reports identifying the category types and reason codes. TDOT uses this information to monitor and track change order trends to make program improvements and will continue to ensure the information is readily available with resources to collect the data identified.

As noted, the Department is currently tracking change orders for trends and using the information (reasoning codes) to make improvements to program areas. We agree that the current process can be expanded to measure and track individual project performance. In fact, as the Department transitions into full implementation of IPD, change orders that are executed on a project will be shared with the project Design Teams to make needed program or process changes to avoid making similar errors.

Additionally, project delivery method comparisons between Design-Bid-Build and Alternative Delivery are not straightforward – not only due to differing timelines, but also due to risk reduction, optimization of constructability, and cost transparency inherent to a CM/GC alternative delivery project. So, although up-front capital costs may sometimes be higher with CM/GC, other costs associated with time, like increased user costs, material, and labor escalation, etc., are avoided in the CM/GC model. A disclaimer will be added to any future statements related to cost savings calculations.

Funding Challenges

Management's three identified challenges are directly impacted by available funding

While each of the department's challenges has its own difficulties, each has one underlying similarity: **the availability of funding**. Since at least 2014, management's **project completion and delivery goals** have been impacted by a backlog of projects with estimated funding needs in the billions. In January 2015, the Tennessee Comptroller of the Treasury's Office of Research and Education Accountability issued the *Tennessee Transportation Funding: Challenges and Options* report. The report highlighted the ineffectiveness of Tennessee's gas tax in supporting the state's road system. The report stated that the "fixed-rate [fuel] taxes are a diminishing tax base." The report also included multiple commonly proposed solutions seen nationwide to increase transportation funding, which include

- supplementing the gas tax by establishing a Vehicle Miles Traveled (VMT) tax,
- increasing vehicle registration taxes,

- debt financing, and
- using public-private partnerships.

While raising the gas tax is the fastest and least costly method to increase revenue for highway funding, multiple studies cite the increase in fuel-efficient vehicles and electric/hybrid vehicles as a detriment to the gas tax's longevity and viability as a revenue source.

The department sought funding to address the \$8.5 billion project backlog through the passage of the IMPROVE Act which raised fuel taxes and increased vehicle fees

In January 2017, then Governor Bill Haslam introduced the Improving Manufacturing, Public Roads, and Opportunities for a Vibrant Economy Act (IMPROVE Act), which became Public Chapter No. 181 and later codified as Section 67-3-912, *Tennessee Code Annotated*. The IMPROVE Act was designed to lower taxes²⁷ for Tennesseans but also provide an increase to the gas tax and motor fuel tax, which was last increased over 30 years ago. In addition, the Act increased vehicle registration fees and added a \$100 fee for electric vehicles to address the growing backlog of road and bridge projects in the state's transportation system.

To provide specificity to the backlog of projects, the IMPROVE Act identified 962 potential road and bridge projects across all 95 counties in the state. Based on management's estimates from 2016, they initially estimated that all 962 projects would cost \$11 billion to complete and would be under contract by 2032. The IMPROVE Act included staggered tax increases over multiple fiscal years, and those increases in revenues continued to meet projections through fiscal year 2023.

The department's backlog increased to \$26 billion in 2023, and the department sought additional funding and delivery method options which were made available through passage of the Transportation Modernization Act

In 2023, the General Assembly passed the Transportation Modernization Act (TMA), which became Public Chapter No. 159. The TMA grants the department a one-time \$3 billion state fund, known as the Transportation Modernization Fund (TMF), which allocates \$750 million to each of the department's four regions to fund transportation projects. Additionally, the TMA grants the department's Commissioner \$300 million for the State Aid Program. The State Aid Program provides funding for local counties to maintain certain roads that connect to state highways. The TMA requires an increase in the vehicle registration fee for electric vehicles and hybrid vehicles starting on January 1, 2024. In the following years, the electric vehicle registration fee will increase through January 1, 2028, and will be indexed for inflation. The TMA also allows the department to procure more

²⁷ The IMPROVE Act permanently lowered taxes for manufacturers, and sales tax on the retail sale of food and food ingredients for human consumption, and completed the phase-out of the Hall Income Tax, which applied to individuals and other entities receiving interest from bonds and notes and dividends from stock.

alternative delivery project contracts and authorizes the department to enter into user-fee facility²⁸ engagements, such as choice lanes.

Congestion-related issues have also continued to grow and have resulted in even greater funding needs. On the department's Build With Us website they state, "[The department] is falling behind on delivering the infrastructure solutions needed to support the volume of population moving to Tennessee." The state's long-term growth is dependent upon a transportation system that supports economic growth and quality of life.

Based on our review of the department's challenges as they relate to management's cost-estimating process (also as noted above in the **Delivery Challenges** section) we recommend management continually evaluate their process to ensure management and stakeholders can make the best decisions for the state's transportation system. See **Observation 2**.

Observation 2

Management should evaluate their cost-estimating process to better plan for future changes in construction costs and delivery

Management's original cost estimates for completing IMPROVE Act projects did not include inflationary projections

Rising levels of inflation have significantly contributed to the department's increased project costs from pre-pandemic amounts. Management explained that the 2017 original funding estimates of **\$11 billion** for IMPROVE Act projects used a 2016 cost basis, with no cost escalation²⁹ or an index for inflation, which is their typical practice. This means that the department would have had to complete those IMPROVE Act projects quickly to stay aligned with the original cost estimates. See **Table 10** for management's IMPROVE Act **project estimate increases** since the Act's passage in 2017.

²⁸ According to the Transportation Modernization Act, Section 54-3-104, *Tennessee Code Annotated*, "the department may develop user fee facility projects and operate user fee facilities as provided in this chapter." Section 54-3-103 defines user fee facilities as "a facility where the development or operation of the facility is wholly or partially funded with user fees." A facility is defined as "a highway, bridge, tunnel, parking lot or garage, or other private entity or other paved surface or structure that is designed to carry or contain land transportation vehicles, or another transportation-related facility."

²⁹ Escalation is the provision in a cost estimate for increases in the cost of labor, equipment, and material due to continuing price changes over time.

Table 10
Original 2017 Estimates for IMPROVE Act Projects and Cost Increases
As of 2021 and 2022

Year	Estimate	Percent Change
2017	\$11 billion	–
2021	\$15.3 billion	+ 39%
2022	\$16 billion	+ 5%

Source: The department's presentation on the IMPROVE Act from May 5, 2021, and the department's Build With Us presentation on March 2, 2023.

According to management, they completed the quick, low-cost projects first and now have the larger and more expensive projects remaining. Additionally, inflation is rising faster than user fee revenue;³⁰ this inflation has significantly increased project cost estimates. Management estimates that **it will take until the year 2073 (an additional 50 years) to complete the remaining projects.** Management previously reported that these projects would be in the construction phase or completed by 2032. See the number of management's completed projects since 2019, as shown in Table 11.³¹

Table 11
Status of IMPROVE Act Projects
By Fiscal Year

Status of Projects by Phase						
Year	Not Started	Preliminary Engineering Phase‡	Right of Way Phase	Construction Phase	Completed*	Total
June 12, 2019†	517	258	58	74	55	962
June 30, 2020	400	294	86	86	96	962
June 30, 2021	341	287	98	88	148	962
June 30, 2022	287	269	106	92	208	962
June 30, 2023	277	263	105	76	241	962

Source: Created by the auditor based on annual IMPROVE Act status reports provided by the department.

* Deleted projects are included in the total completed.

† We reported totals as of June 12, 2019, to allow the reader continuity from our prior report.

‡ This combines the planning and design phases of the construction process.

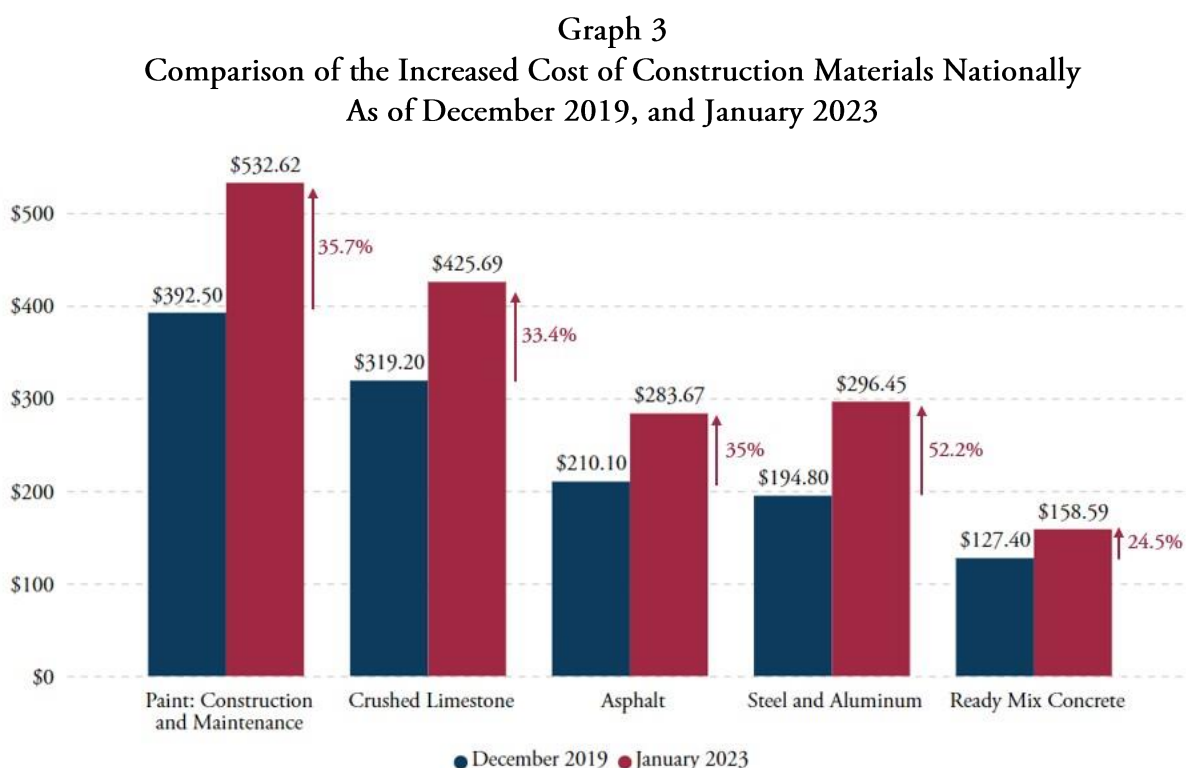
³⁰ User fees are comprised of revenues from the gas tax, motor fuel tax, vehicle registration fee, and gas inspection tax.

³¹ Since 2019, the department has substituted or deleted 47 projects or 2% from the original project list. Substitutions and deletions occur at the request of the local highway superintendent for reasons such as, the projects were completed by the locality, or the locality was not interested in completing the project.

When estimates do not include future cost increases, such as inflation factors, management cannot make critical funding decisions for all projects planned and started but not completed.

The cost of construction materials has increased significantly since 2017

The cost of constructing a road project is largely dependent on the cost of materials used, and as fuel costs increase, so does the cost of highway construction. **Graph 3** shows the upward trend in cost for five commonly used materials in construction and maintenance projects: concrete, limestone, asphalt, steel, and paint.³²



Source: Created by auditors using data from the Federal Reserve Economic Data (FRED) tool, an online database used by the Federal Reserve bank of St. Louis.

Management provided data from its Average Unit Price database³³ that shows how the **increased cost of construction materials is affecting its project costs**. **Table 12** is a summary of the increased costs the department identified for commonly used construction materials from fiscal year

³² According to management, the department uses asphalt in road resurfacing; concrete for structures and roads; steel and aluminum for guardrail maintenance and structures; paint for road striping; and crushed limestone for structures and roads.

³³ When contractors submit bid proposals, they input costs for each line item in the contract through the department's bidding software. The department's Average Unit Price (AUP) database then compiles and averages all costs submitted by contractors for each item for a specified period of time, typically annually.

2018 to fiscal year 2022. The department compiled data from the prices all contractors submitted when bidding on projects and calculated the increases in each of these materials.

Table 12
Increasing Costs of Construction Materials in Tennessee
For the Period July 1, 2017, to June 30, 2022

Materials	Increase
Hot Mix Asphalt	39%
Steel	39%
Concrete	47%

Source: Created by the auditor based on the department's bid data.

Management has not changed its estimation practices to account for inflationary pressures

Management explained that historically, construction costs have increased at a rate of about 4% per year but have doubled since 2020. Originally, all projects were to be under contract by the year 2032, and as such, it was reasonable to assume costs would have risen significantly in sixteen years, although the pandemic contributed to those costs rising more quickly. **Because management makes estimates using current costs, which are not indexed for inflation or other considerations, the estimates remain below any likely future cost.** As management explained in its delivery challenges, on average, projects take 15 years to fully complete. Each year that projects remain in preconstruction phases, the cost of future construction continues to grow. Management's current estimation practice (current cost model with no inflation factors) may no longer be a realistic methodology for estimating future construction projects through to completion.

As evidenced by the increased completion time and cost of IMPROVE Act projects, raising the fuel tax rate was a short-term solution that has not sustained future growth. With rising inflation costs, Tennessee's backlog of projects has continued to grow and resulted in the additional legislation seen with the Transportation Modernization Act. Without careful consideration of the transportation system's long-term future, and implementation of innovative solutions and data-driven decisions, the state increases its risk of the construction backlog continuing to grow with a transportation system that is unable to support its citizens and economic growth.

Recommendation

The Commissioner and management should ensure project cost estimates are calculated using recent data with regular cost updates to ensure variations in the state's economy are accurately included. When presenting information to the public, the department should ensure that estimates are calculated to include potential cost increases due to the timing differences between project development and completion of construction.

The Commissioner and management should work to implement tools that help management use all available data in the most effective manner for providing transparent and reliable information to the General Assembly and stakeholders.

Management's Comment

We concur. The department has begun the implementation of Integrated Program Delivery (IPD) to provide consistency and transparency throughout the project delivery process. This will help teams be more reliable and efficient.

The Project Delivery Network (PDN) was created to document the delivery process and provide staff a simplified roadmap to delivery. A project team is formed from each technical discipline led by a project manager delivering projects and programs through a matrix organization to achieve the goals of the project within a defined scope, schedule, and budget. During the context/scoping stage of the PDN the project team works to define the scope of the project, develop a risk matrix, and complete a project estimate. A Project Commitment Document (PCD) is drafted, memorializing the scope of work, schedule, and is reviewed along with the risk matrix during each project milestone to verify that the project is on the planned course. To plan for future changes in construction cost the department has created a revised estimate process utilizing a quantity-based estimate and inflating the construction cost to the scheduled year of construction. These estimates are completed at the end of each project milestone and are reviewed for compliance to the PCD.

Overall Summary

When it comes to transportation and mobility in Tennessee, [the state is] at a critical juncture.

Workforce Congestion Delivery

20% vacancy rate as of 2022



\$26 billion project backlog



Projects take 15 years on average to complete



Source: 2023-2024 TDOT Budget Presentation and Build With Us White Paper.

To position the state and the department for successful fulfillment of the department's mission, management must address their identified challenges and make fundamental change as necessary



The challenges presented by management are significant obstacles for the state and the department to overcome so that state leadership can continue to provide a state transportation system that supports users' needs and promotes the state's economic growth. As with all state functions, state leaders have to address funding priorities that are in the state's best interest. Given that this department's challenges will not be resolved overnight, management should continue to focus on their responsibility to provide solutions that support a reliable transportation system.

Information Systems Planning and Security

State leaders must make well-informed decisions about numerous information technology projects each year. To most effectively prioritize and allocate resources, leaders require relevant and timely information about all current and future plans surrounding information systems. Additionally, state agencies are required to maintain their systems in accordance with state security policies.

Our goal was to focus on the Department of Transportation's critical information systems for construction and maintenance projects to determine if these systems can support current and future business operations and security needs. The Department of Transportation's lack of information systems planning for upgrading and replacing aging critical systems and applications hinders the department's ability to respond dynamically to its changing business operations. Furthermore, the department cannot efficiently meet its mission to provide a safe and reliable transportation system without secure information systems that track and manage data to support the state's infrastructure. See **Finding 1** and **Finding 2**.

General Background

The Information Systems Council (ISC) of the State of Tennessee oversees information technology for the entire state and develops policies for managing the state's information technology overall. Section 4-3-5502, *Tennessee Code Annotated*, requires the ISC to establish effective long-range planning for the state's information management; to meet this requirement, the ISC established a policy that requires every state agency to prepare an annual information systems plan.

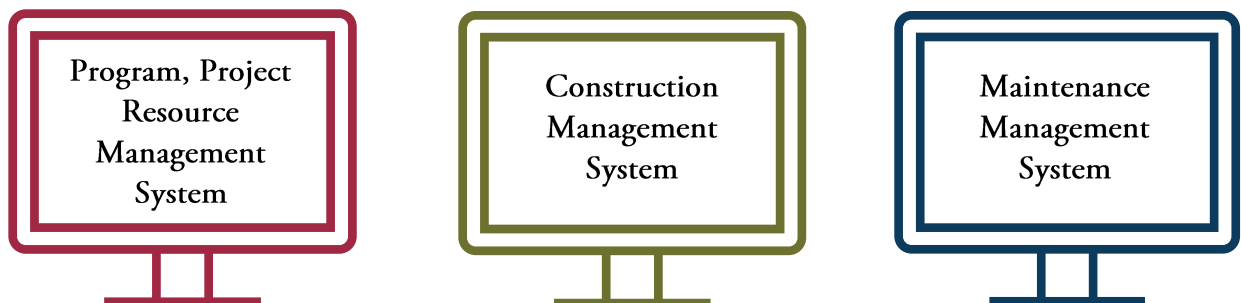
The Department of Finance and Administration's Strategic Technology Solutions (STS) Division provides IT solutions and services to various state agencies. ISC's policy gives STS the authority to oversee the statewide planning and review process. As part of the annual planning process, STS sends all state agencies guidelines for preparing and submitting their information systems plans. These guidelines include an overview of the information systems planning process, detailed instructions on content that the agency should add to the plan, and a deadline for when each agency should submit its plan to STS. STS staff are available to assist agencies as they prepare their plans.

The Department of Transportation (the department) is also required to adhere to the state's information security guidance outlined in the *Enterprise Information Security Policy*, which protects IT resources against unavailability, unauthorized or unintentional access, modification, destruction, or disclosure as set forth by the ISC. Department management is responsible for monitoring its information security controls to ensure compliance and to protect sensitive data. Department management coordinates with key members from the STS security group to monitor security over IT resources hosted in the state's data processing centers. Management also completes other information security activities that are confidential pursuant to Section 10-7-504(i), *Tennessee Code Annotated*.

The department uses three critical applications for construction management

The department relies on information systems to support its mission and critical daily operations, to keep construction projects on schedule, and to pay contractors on time. Three of the department's key applications used to support these functions are shown in Exhibit 12.

Exhibit 12
The Department's Critical Applications



PPRM	CMS SiteManager	MMS
Implemented in 2001	Implemented in 2002, 2007	Implemented in 2005
1,300 users	1,200 users	900 users
Manages all phases of a project from preconstruction through closure	Manages all aspects of work completed by contractors during construction	Manages maintenance work completed by department employees

Source: Auditor created based on discussions with department management.

PPRM is the department's beginning-to-end project development, planning, and delivery system. It provides enterprise-wide access to project information and communicates with state and federal accounting systems. This application tracks and documents work completed throughout all phases of a project's life, from early planning activities to post-construction project close-out. Users enter data in real time through the system online, and the system sends nightly batches of financial expenditures to Edison, the state's enterprise resource management and accounting system.

CMS was implemented in 2002, and the department added the SiteManager module in 2007. CMS SiteManager is the department's comprehensive construction management tool for work completed by contractors. This application provides data entry, tracking, reporting, and analysis of contract data from contract award through construction completion. It is used to manage the contractors' activities, daily work, materials used, and payments, as well as changes to roadway construction contracts.

MMS tracks all ongoing maintenance activities³⁴ that department employees perform throughout the state. The MMS system receives a manual payroll and timesheet upload from Edison every Monday and every payday. In addition, Edison automatically shares an upload of equipment tracking data each month to MMS.



Finding 1

For the previous six years, the department did not participate in formal information systems planning activities as required by state policies and, as a result, severely hampered the department's ability to support its strategic initiatives to upgrade and replace critical information systems

Department management did not complete or submit information system plans for STS to review

Since 2017, Department of Transportation management has acknowledged that its critical information systems (PPRM, CMS SiteManager, and MMS) need to be either upgraded or replaced but did not move the department forward in these efforts. Information systems planning is important because it helps management ensure that information systems are used in a way that maintains the department's critical functions. Introducing a new information system or upgrading an existing one is challenging, and complex information system projects require careful planning, communication, and execution.

ISC's policy³⁵ requires state agencies to prepare and submit annual information systems plans. We found that the department did not participate in the formal information systems planning process during fiscal years 2016 to 2022, violating ISC policy requirements. According to the current Chief Information Officer, the former Chief Information Officer did not believe that the department benefited from participating in the information systems planning process; in his reported view, planning three to five years ahead, as this process required, was too complicated and cumbersome.

³⁴ Maintenance activities include, but are not limited to, patching potholes, clearing pavement, clearing ditches and culverts, establishing proper drainage, shoulder grading, repairing traffic signs and road markings, lighting roadways, maintaining bridges, controlling vegetation, and resurfacing.

³⁵ ISC Policy 7.00, "Information Systems Planning."

Department management did not consider participating in the formal planning process with STS until the former Chief Information Officer retired in 2022.

The department submitted a draft plan to STS in June 2023, but the plan did not contain all the required information

In June 2023, the department finally submitted a draft information systems plan to STS; however, the plan did not contain the information STS requested, such as estimated project costs. In addition, the draft plan had several “to be determined” entries for timelines across many information system projects. According to the current Chief Information Officer, the department is in the process of planning to replace the three critical information systems; however, management was not able to provide specific target dates, timelines, and milestones

for the replacement of these critical systems. As of September 2023, STS had not formally reviewed and approved the draft plan the department submitted. The current Chief Information Officer explained that the department recognizes the importance of maintaining compliance with ISC policies and the benefits of a robust information systems planning process going forward.

In one of its draft plans (not submitted to STS for review) as far back as 2017, management stated, “[PPRM] is outdated and built on technology that is near end of life. It is time to redesign and rebuild it.”

Not properly conducting information systems planning can have a systemic and wide-reaching impact on the department’s ability to support its strategic initiatives

Information systems that facilitate collaboration and communication between project teams and other information systems are essential to keep pace with today’s modern business. Without adequate planning, the department faces increased risks of misaligning project priorities to business needs, as well as misallocating monetary and staffing resources. It also risks experiencing implementation delays, project cost overruns, and project failures. Information systems planning is critical as the department’s projects affect its ability to provide a safe and reliable transportation system. See also **Delivery Challenges** in the section **The Department of Transportation’s Challenges for Tennessee’s Infrastructure System**.

During our audit work in other areas, we identified deficiencies with an information system used by the Office of Rail Safety and Inspection caused, in part, by poor information systems planning to replace or update an aging system. See **Finding 3** for further details about that condition and our recommendations. We also noted that the department had not assessed risks or identified the risks noted in this finding in management’s Financial Integrity Act Risk Assessment; see the **Risk Assessment** section, **Finding 6**.



Recommendation

We recommend that department leadership engage in the state's formal information systems planning process in accordance with ISC policy and STS guidance. To achieve the status of a cutting-edge leader for the state's transportation system, department leadership should ensure they adequately plan to replace aging technologies that will support their business needs and strategic goals. Management should ensure that their future information systems plans include specific target dates, milestones, and relevant monetary information, all of which are key to decision-making.

Management's Comment

We concur. The previous TDOT CIO did not think the state ISP process aligned with working in an Agile environment and the ISP process would not be useful in planning or delivering services to the agency. In turn, no ISP was completed during this period. However, we have submitted an ISP this year and it has been reviewed and approved by STS. TDOT IT will continue this process going forward.

TDOT IT has also implemented the following control mechanism for this finding. As of 9/1/23, a team was established in IT to focus on compliance. This team has oversight concerning Inventory, ISP, Patching, Disaster Recovery and process adherence.



Finding 2

The department did not provide adequate internal controls in one area, increasing the risk of unauthorized access to department systems and disruption to department services

The Department of Transportation did not effectively design and monitor internal controls in one area, increasing the risk of unauthorized access and malicious activity. We found internal control deficiencies related to several department systems because the department did not adhere to state policies. Ineffective implementation and operation of internal controls increase the likelihood of unauthorized access to the department's systems. This unauthorized access could disrupt or interfere with the services the department provides.

Pursuant to Standard 9.61 of the U.S. Government Accountability Office's *Government Auditing Standards*, we omitted details from this finding because they are confidential under the provisions of Section 10-7-504(i), *Tennessee Code Annotated*. We provided the department with detailed information regarding the specific conditions we identified, as well as the related criteria, causes, and our specific recommendations for improvement.



Recommendation

Management should correct these conditions by promptly developing, consistently implementing, and continuously monitoring internal controls in this area. Management should implement effective controls to ensure compliance with applicable policies and other requirements, assign staff to be responsible for ongoing monitoring of the risks and mitigating controls, and take action if deficiencies occur.

Management's Comment

We concur. TDOT should be in compliance by the end of the calendar year. To address the identified control weaknesses, TDOT IT has also implemented the following control mechanism for this finding. As of 9/1/23, a team was established in IT to focus on compliance. This team has oversight over the weakness identified and will ensure the department is in compliance.

Rail Safety Inspection Program

Maintaining railroad crossings in good condition is integral to preventing train derailment and providing a safe transportation system for motorists. Tennessee and other states are experiencing difficulties in receiving timely responses from railroad companies to make required crossing repairs after inspections are performed. Our goal was to determine if the Rail Safety Inspection Program had improved their inspection and complaints processes since the prior audit.

The Department of Transportation should conduct a comprehensive review of its oversight of the Rail Safety Inspection Program, including the inspection process used to meet its objective of promoting rail and highway safety at crossings. The department should evaluate its current process for coordinating with railroad companies to repair railroad crossings. See **Finding 3**, **Observation 3**, and **Emerging Issue 2**.

General Background

The department's Office of Rail Safety and Inspection is responsible for inspecting the state's public at-grade highway-rail crossings

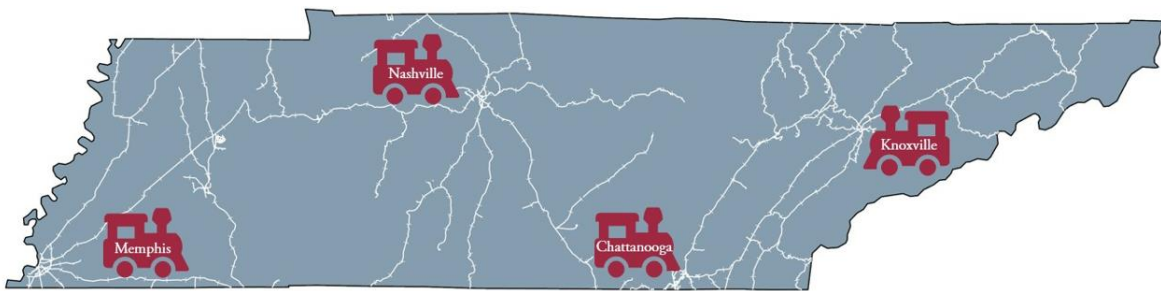
Public at-grade highway-rail crossings are crossings where roads and rails intersect at the same elevation on a public road. Tennessee does not inspect private at-grade crossings as they are the responsibility of the private landowner. The **three largest railroads own 64% of the rail track** in the state; see **Figure 14** and **Map 1**. The Department of Transportation (the department) is responsible for coordinating repairs with the railroad companies for crossings in poor condition.

Figure 14
Tennessee Railroad System Facts



Source: Created by auditor based on data from the department's 2023 Statewide Multimodal Freight Plan and from the Federal Railroad Administration.

Map 1
Railroad Tracks in Tennessee



Source: Created by auditor based on information from the 2023 Tennessee Statewide Multimodal Freight Plan.

Rail crossing inspections help to support the safety and reliability of the state's transportation system by preventing rough crossings and incidents such as accidents for motorists and train derailments. Serious train derailments can lead to public evacuations and the release of hazardous materials into the environment. See **Table 13** for the number of incidents related to crossings and train derailments in Tennessee.

Table 13
Incidents in Tennessee
For Calendar Years 2019 Through 2022

Incident Type	2019	2020	2021	2022
At-Grade Highway-Rail Crossing Incidents	52	51	57	51
Train Derailments	32	21	26	40

Source: Data obtained from the Federal Railroad Administration website:
<https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/TenYearAccidentIncidentOverview.aspx>.

Tennessee voluntarily participates in the Federal Railroad Administration’s (FRA) State Safety Participation Program, a nationwide initiative where states partner with the FRA to ensure railroad crossings are inspected regularly to reduce deaths, injuries, and property damage resulting from rail incidents

Title 49, *Code of Federal Regulations*, Part 212, states that this program employs safety inspectors to perform rail safety inspections. Before a state agency can participate, it must enter into a multiyear agreement with the FRA to exercise this inspection authority. We obtained the current agreement for the program, which provides general requirements and very broad inspection plans. States have the power to participate in the State Safety Participation Program and can terminate their involvement at any time.

The FRA reserves the exclusive authority to assess penalties and issue orders to the railroads; however, federal law authorizes states to assess civil penalties. The department has the “power and authority” under Section 65-3-123, *Tennessee Code Annotated*, to inspect the conditions of all trains, rail rights-of-way, rail yards and terminals, and rail loading and unloading facilities within Tennessee. Section 65-11-101 et seq., *Tennessee Code Annotated*, requires railroad companies and operators to repair the surface area of crossings and maintain the crossing surfaces at ten feet on either side of the rail. If they do not, Section 65-11-102, *Tennessee Code Annotated*, states the department can issue fines of at least \$10 and not more than \$100 for noncompliance.³⁶

The railroad account³⁷ established in statute supports the department’s Office of Rail Safety and Inspection’s operations

Railroad companies pay fees to the state based on the actual ton-miles³⁸ transported annually; these fees are placed in an account (the railroad account) to be used for inspection, control, and supervision of railroads.³⁹ For the past five years, the account has averaged a balance of \$1,063,074. According to the Rail Inspection Manager, the railroad account could be used to pay for additional staff for the office or purchase equipment needed to perform inspections. For fiscal year 2023, the office plans to use the funds remaining after paying for the administration of the program to purchase vehicles to use during inspections this year.

According to the
Director of Finance, as
of June 2023, the
railroad account’s
balance was
\$1,102,349.

³⁶ Section 65-11-102, *Tennessee Code Annotated*, was established in 1889 and last amended in 1975.

³⁷ Section 65-3-201 et seq., *Tennessee Code Annotated*.

³⁸ A ton-mile is one ton of freight shipped one mile and reflects the volume and distance of shipped freight.

³⁹ No federal or state appropriations fund inspections or inspector salaries.

The Office of Rail Safety and Inspection aids the FRA⁴⁰ by performing routine inspections and reinspections from crossing-related complaints

The Office of Rail Safety and Inspection (the office) employs five state inspectors, including the Rail Inspection Manager, to conduct regularly scheduled inspections and complaint-related inspections of public at-grade highway-rail crossings. The inspection schedule is created by the inspectors based on the type of crossing, either enhanced or non-enhanced,⁴¹ and the rating the crossing received in its most recent inspection. The inspectors will provide their inspection schedule to the Rail Inspection Manager. The Rail Inspection Manager verbally requires inspectors to inspect enhanced crossings every six months and non-enhanced crossings annually and to assign crossings a rating of good, fair, or poor. See **Figure 15** for an example of an enhanced crossing with lights and gates. Inspectors are to monitor poor-rated crossings every 30 days until the railroad company makes repairs to improve the crossing's rating to fair or good. Once the rating is improved, the crossing returns to the normal inspection cycle. The Rail Inspection Manager explained that he also performs regular inspections of crossings, and as time permits, he will randomly reinspect crossings to compare them to the inspector's report to see if they have the same conclusions.

Figure 15
Enhanced Crossing Example



Source: Photo taken by an auditor at a crossing in Nashville, Tennessee.

Complaints related to railroad crossings come from multiple sources, including but not limited to legislators, local governments, and the public. The office receives complaints regarding

⁴⁰ The FRA inspectors conduct their own federal inspections of the crossings though they have a larger territory that includes more than Tennessee.

⁴¹ An enhanced crossing has additional safety measures, such as lights and moving gates to stop traffic from crossing when there is a train, while a non-enhanced crossing has only signage to warn the public.

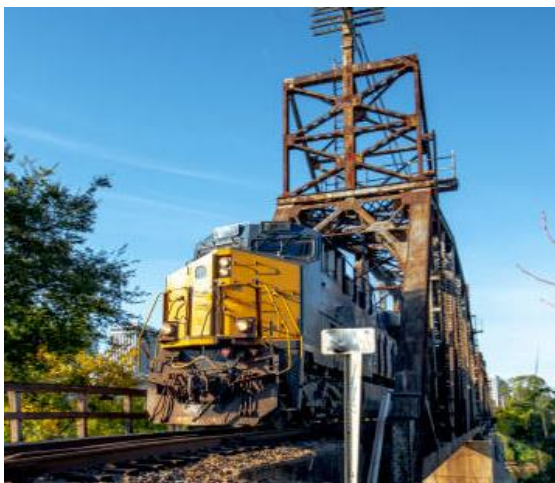
crossings through a dedicated email (TDOT.RailAdmin@tn.gov), the TDOT Record – A – Comment email on the department’s website (TDOT.Comments@tn.gov), and from calls to office staff whose contact information is available on the department’s website. Staff enter complaint information into a Microsoft Excel complaint log maintained outside of the Railroad Safety Inspection System (RRSIS), the office’s information system. After receiving the complaint, the office will follow up if the complaint is related to a public crossing by performing an inspection when applicable.

The Office of Rail Safety and Inspection uses RRSIS, a 13-year-old in-house information system implemented in 2010, to document and maintain scheduled inspections and inspections derived from complaints. The office must maintain inspection reports and applicable documentation for five years as part of the department’s records disposition authorization⁴² 442.

Results of the Prior Audit

In the department’s August 2019 performance audit, we reported a finding that management’s inspection procedures were inefficient and did not adequately identify the reason for the inspection,

Figure 16
Train on a Nashville Railway Bridge



track the dates when the department received complaints, have a formal communication process to inform railroad companies of issues noted in inspections, and did not require railroad companies to notify the department when repairs were completed. Department management concurred in part with the finding, stating that the complaint-handling process had sufficient follow-up and documentation; however, management explained it would use a top-to-bottom review to determine a systematic approach “to record complaints where we have enough documentation.” Management also commented that state law does not require railroad companies to notify the department when repairs are completed.

At the six-month follow-up, management planned to implement a Rail Safety Complaint form to document rail complaints. Management also stated that they completed the top-to-bottom review of the Rail Safety Inspection Program, and the Commissioner would review the results and make

⁴² Section 10-7-303, *Tennessee Code Annotated*, requires public officials to create and maintain records that document government business transactions. These records provide evidence of government operations and accountability to citizens. Public officials must maintain this information according to established records disposition authorizations (RDAs), which describe the public record, retention period, and destruction method for each record type under an agency’s authority.

recommendations for changes to the program. We obtained a copy of the *Rail Safety Inspection Program Top to Bottom Review*.

Management implemented limited recommendations from the *Rail Safety Inspection Program Top to Bottom Review*

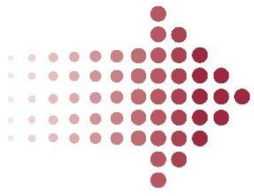
In response to the August 2019 performance audit finding, management contracted with HDR Engineering,⁴³ which conducted the *Rail Safety Inspection Program Top to Bottom Review* in July 2019 to assess the program's effectiveness and make recommendations. The report had over 13 recommendations, which included, but were not limited to,

- continuing to perform inspections in accordance with state law,
- establishing annual program goals and performance metrics that are updated quarterly,
- revising and updating the *Inspection Operations and Procedural Manual* and make the manual available online [sic],
- establishing program processes for real-time reporting to provide management a basis for decisions and transparency to the public and railroad companies, and
- restructuring staff, and develop an inspection plan for staff, and raise compensation levels [sic].

See **Appendix 12** for excerpts of **all** recommendations made in the *Rail Safety Inspection Program Top to Bottom Review*. As of June 2023, the department implemented **two** of the recommendations in the bulleted list above; they restructured the inspection staff and revised the Individual Performance Plan work outcomes to provide more clarification on management's expectations of inspectors. When the report was released in 2019, the former Commissioner, former Deputy Commissioner, and the current Freight and Logistics Director⁴⁴ of the Office of Rail Safety Inspection (the office) decided not to implement other recommendations from the review because one of the recommendations of the report was to establish a real-time reporting information system. The state of Ohio was used as an example in the review because they were implementing a new system. Later, the office learned that the state of Ohio's information system was not sufficient to meet the needs of its railroad crossing inspection program, leading to management's concern that the remaining recommendations were not credible.

⁴³ HDR Engineering is a consultant that continues to perform work for the department.

⁴⁴ The Freight and Logistics Director also serves as the department's Assistant Chief of Environment and Planning.



Finding 3

The Office of Rail Safety and Inspection lacks key program management components—such as a reliable information system and adequate controls for railroad crossing inspection and complaint procedures—to ensure the railroad program is meeting its objective for safe crossings

Management did not provide adequate oversight and did not establish the necessary controls for administering the Rail Safety Inspection Program

According to the office’s Statewide Rail Plan, one of the objectives of the Office of Rail Safety and Inspection is to “Invest in safety improvements at highway-rail grade crossings” by “[promoting] rail and highway safety by **conducting crossing inspections and requiring railroads to promptly repair inadequate grade crossing surfaces [emphasis added].**” Management is responsible for establishing the necessary operational processes and related controls to reasonably ensure that both management and staff can effectively carry out the office’s objectives, functions, and goals and can consistently comply with state statute. Since the last audit, however, management has not sought to establish the necessary processes and controls to effectively achieve this objective. Ultimately, this has created a systemic problem (detailed below) for the Rail Safety Inspection Program.

Management implemented limited recommendations from its top-to-bottom review

Although revising and updating the Office of Rail Safety and Inspection’s (the office) *Inspection Operations and Procedural Manual* was recommended in both the top-to-bottom review and in the prior audit, management continues to operate with verbal policies and procedures instead. The lack of clear written procedures has contributed to the data reliability concerns we report throughout this finding. To illustrate, the Rail Inspection Manager (the manager) explained that inspectors should document in RRSIS when a reinspection is done, but he **did not specify** how inspectors should document this in the system. We noted inconsistencies in how inspectors were documenting reinspections, with some inspectors using the comment box in RRSIS to document reinspection dates and other inspectors creating a new inspection report for each reinspection.

“Revise and update the *Inspection Operations and Procedural Manual*. Additionally, the manual should be available electronically online.”

Source: Rail Safety Inspection Program
Top to Bottom Review.

Management is responsible for designing, implementing, and monitoring internal controls in accordance with Green Book, Overview, Section 3, OV3.07, which states,

A deficiency in internal control exists when the design, implementation, or operation of a control does not allow management or personnel, in the normal course of performing their assigned functions, to achieve control objectives and address related risks.

Additionally, **we noted other programmatic concerns** such as inspectors deciding their own inspection schedule and sending the manager their planned schedule; however, the manager does not ensure that the schedule meets the needs of the office or that the inspections were indeed performed.

“Inspectors generally develop their own inspection plans in the form of a weekly itinerary, but the itinerary lacks work details and there is no real-time tracking of the inspectors’ daily activities.”

Source: Rail Safety Inspection Program
Top to Bottom Review.

Furthermore, because the statute does not require the railroad companies to inform the office when they make repairs, the office has continued its practice of having their own inspectors perform a reinspection every 30 business days to see if the rail company repaired the crossing. Management explained that although 30 days is their standard practice for conducting reinspections, inspectors often work with railroad companies, such as coordinating repairs for multiple close crossings or communicating delays in repair because of weather-related issues. Inspectors stated they informed railroad companies of needed repairs by phone; however,

inspectors did not maintain documentation of the contact with the rail company. Without such evidence of communication with the rail companies, including notifications from railroad companies that repairs were made, or repairs would be delayed, the office has had to deploy their inspectors to reinspect the crossings to establish the status of the requested repairs. See **Figure 17** for examples of poor-rated crossings.

Figure 17
Poor-Rated Crossings



Source: Obtained from inspection reports for poor crossings, specifically crossings 601 East Jefferson St., Brownsville, TN (top left); 1126-1132 East College St., Brownsville, TN (top right); and Industrial Avenue, Memphis, TN (bottom).

We also found that management's **complaint process** did not include the ability to track an inspection within RRSIS. The complaint log information is maintained outside RRSIS and does not include an inspection number or consistently note the resolution. This prevents management from having access to the complaint-related inspection and ultimate resolution. Because management did not design a process that documented the evaluation and ultimate resolution of every complaint, neither we nor management could determine if complaints were handled appropriately by an inspection or other resolution.

“The current Program management practices and tracking systems appear to be inefficient and lack data driven planning, clear purpose, and accountability in comparison to other state programs and FRA guidelines reviewed.”

Source: Rail Safety Inspection Program Top to Bottom Review.

Without written policies and procedures to provide guidance to staff, the office risks losing organizational knowledge when key personnel leave. In addition, without guidance, staff may not sufficiently document all critical inspection and complaint processes related to crossings. The lack of documentation prevents management’s oversight to ensure railroad companies are informed and could impact the office’s ability to act if railroad companies do not comply with requested crossing repairs. This could delay repairs, causing increased public rail and highway safety concerns.

Management did not review inspection reports before they were finalized to ensure the completeness and accuracy of inspection data entered in RRSIS

The Rail Inspection Manager explained that he performs random on-site reviews of inspectors’ work. He compares the submitted inspection report to his observations to ensure that he agrees with the conclusions drawn by the inspector; however, he does not document the results of the reinspections. He explained that he has not found errors that required revision to the inspection reports. We learned that no other procedures are performed by the manager to review the inspection reports in the RRSIS system before they are finalized, and no one is performing additional procedures to ensure the quality of data in the system. **This has contributed to a lack of reliable data.**

Management is responsible for designing, implementing, and monitoring internal controls in accordance with *Standards for Internal Control in the Federal Government* (Green Book) Principle 16.05, which states,

Management performs ongoing monitoring of the design and operating effectiveness of the internal control system as part of the normal course of operations. Ongoing monitoring includes regular management and supervisory activities, comparisons, reconciliations, and other routine actions.

The Rail Inspection Manager informed us that he is also performing inspections in addition to his managerial duties, which may impact program management by reducing the time he can spend managing the program. Based on discussion with the Freight and Logistics Director, we determined the manager’s inspection reports were also not reviewed by management for completeness and accuracy.

“Create a Field Supervisor Position to be responsible for the routine management of the inspection team. This will allow the transition of the Rail Safety Manager [Rail Inspection Manager] position to a Program Manager role that focuses more on the management of the Program.”

Source: Rail Safety Inspection Program Top to Bottom Review.

Management was aware of RRSIS's limitations but did not develop the necessary compensating controls, including addressing the inability to maintain inspection information necessary for management to administer the safety program, leading to unreliable system-generated reports

We were informed by management that the RRSIS system deletes inspection files after three years. Management, however, did not develop a compensating control to maintain a copy of the inspection reports outside of the system for the required five years⁴⁵ despite knowledge of the design limitations of the RRSIS system. When records are not maintained, management increases the risk that railroad crossing inspections and rating information are deleted prematurely, affecting management's ability to make critical decisions based on the history of crossings identified as being in poor condition.



Source: The Office of Rail Safety and Inspection's Rail Inspection Manager.

We also found that management was unable to produce reliable system-generated reports. We requested a list of all rail crossing inspections and their current inspection ratings for the period July 1, 2019, through June 30, 2023. For the initial list that management provided, we could not verify that the list was complete and accurate. We also noted that the listings showed invalid dates for when inspections occurred, such as 6/00/2020.

After several attempts, management provided additional listings; however, these listings contained inconsistent data, such as different ratings and inspection dates for the same crossing. Finally, we were provided with a different list; however, the list did not include the full date range requested because of the deletion issue discussed above. The list⁴⁶ provided by management contained only enhanced rail crossing inspections, which we had to filter to determine that 16⁴⁷ were rated poor. While we were able to verify the inspection dates against information documented within RRSIS inspection reports [discussed next], we were unable to determine the completeness or accuracy of the population. We requested a similar list of non-enhanced rail crossing inspections, but management was unable to

"Also, inspection data depicts a program that has wide ranging inspection intervals. Many sites are inspected many times leaving others with little to no attention."

Source: Rail Safety Inspection Program Top to Bottom Review.

⁴⁵ Railroad inspector and documents generated as part of the inspection reports are required to be maintained for five years according to records disposition authorization 442.

⁴⁶ All public at-grade highway-rail crossings that received a poor rating from February 12, 2020, through June 13, 2023.

⁴⁷ We filtered the list of 1,673 enhanced railroad crossings by their rating to exclude crossings with a fair or good rating. This left us with a population of 16 poor-rated enhanced railroad crossings for our review.

provide this data. Without ready access to data, management is unable to monitor all aspects of their responsibilities for safe rail crossings in Tennessee.

Our audit review confirmed management cannot make important program decisions without complete and accurate inspection data

We performed a limited review of the inspection data for the 16 enhanced crossings to understand the extent of the problems we described above. From our review, we noted that reinspections were late and that the total number of reinspections that we would expect to have occurred in the calculated time frame compared to actual reinspections was far less. Additionally, management could not provide an inspection report as evidence that the inspection was performed; instead, a date in the comment box of a prior inspection report was the only evidence of inspection. The system is unable to include information documented in the comment boxes for system-generated reports, meaning a report could not be generated that included these dates to aid management in ensuring reinspections are performed timely.

Management is responsible for using quality information to achieve program objectives as required by Green Book Principle 13.02, which states,

Management designs a process that uses the entity's objectives and related risks to identify the information requirements needed to achieve the objectives and address the risks. Information requirements consider the expectations of both internal and external users. Management defines the identified information requirements at the relevant level and requisite specificity for appropriate personnel.

Principle 13.05 states,

Management processes the obtained data into quality information that supports the internal control system. This involves processing data into information and then evaluating the processed information so that it is quality information. . . . Management uses the quality information to make informed decisions and evaluate the entity's performance in achieving key objectives and addressing risks.

We reviewed the department's June 2023 draft Information Systems Plan and found that management identified RRSIS as obsolete but did not include a plan to replace this system. See the **Information Systems** section for **Finding 1** related to the lack of information systems planning.

Additionally, management had not assessed risks or identified the risks noted in this finding in management's Financial Integrity Act Risk Assessment. See the **Risk Assessment** section, **Finding 6**.

Subsequent to our audit fieldwork, management explained that the RRSIS system was undergoing system changes to improve data reporting and thus was unable to provide accurate and

complete data during our audit fieldwork. As of November 2, 2023, the system changes have not been implemented.



Recommendation

The Commissioner and management should evaluate the recommendations and conclusions from the *Rail Safety Inspection Program Top to Bottom Review*, such as establishing program processes for real-time reporting to provide management a basis for decisions and transparency to the public and railroad companies. The Commissioner should ensure that management develops comprehensive written policies and procedures for the rail inspection and complaint process and develop the necessary internal controls to ensure the accuracy and completeness of data for the program. These controls should include, but not be limited to, a documented supervisory review of inspection reports, and documented coordination efforts with the railroad companies to repair crossings. Additionally, the Commissioner should ensure management understands their responsibility to comply with the state's record retention requirements.

The Commissioner and management should assess the current information system to determine the needs of the Office of Rail and Program Safety.

Management's Comment

We concur. The Railroad Safety Inspection System (RRSIS) is antiquated but does meet the basic needs of the Rail Safety Office. Some of the reports were not accessible to the auditors due to an IT transition error when changing systems. TDOT IT has created a dashboard to be able to produce and download the required reports. TDOT is working through the process to get additional enhancements to the RRSIS to make the data more accessible and easier to obtain. Additionally, we will continue to modify the inspection process with written documentation for all inspectors monitoring and entering the information.

Railroad Challenges

The FRA reserves the exclusive authority to assess penalties and issue orders to the railroads; however, federal law authorizes states to assess civil penalties

As discussed above, Tennessee voluntarily participates in the Federal Railroad Administration's (FRA) State Safety Participation Program, a nationwide initiative where states partner with the FRA to ensure railroad crossings are inspected regularly to reduce deaths, injuries, and property damage resulting from rail incidents. Our review of the office's collaboration with the FRA and the railroad companies disclosed the challenges for the office that may ultimately impact the department's goal to ensure railroad crossings are safe. See **Observation 3**.

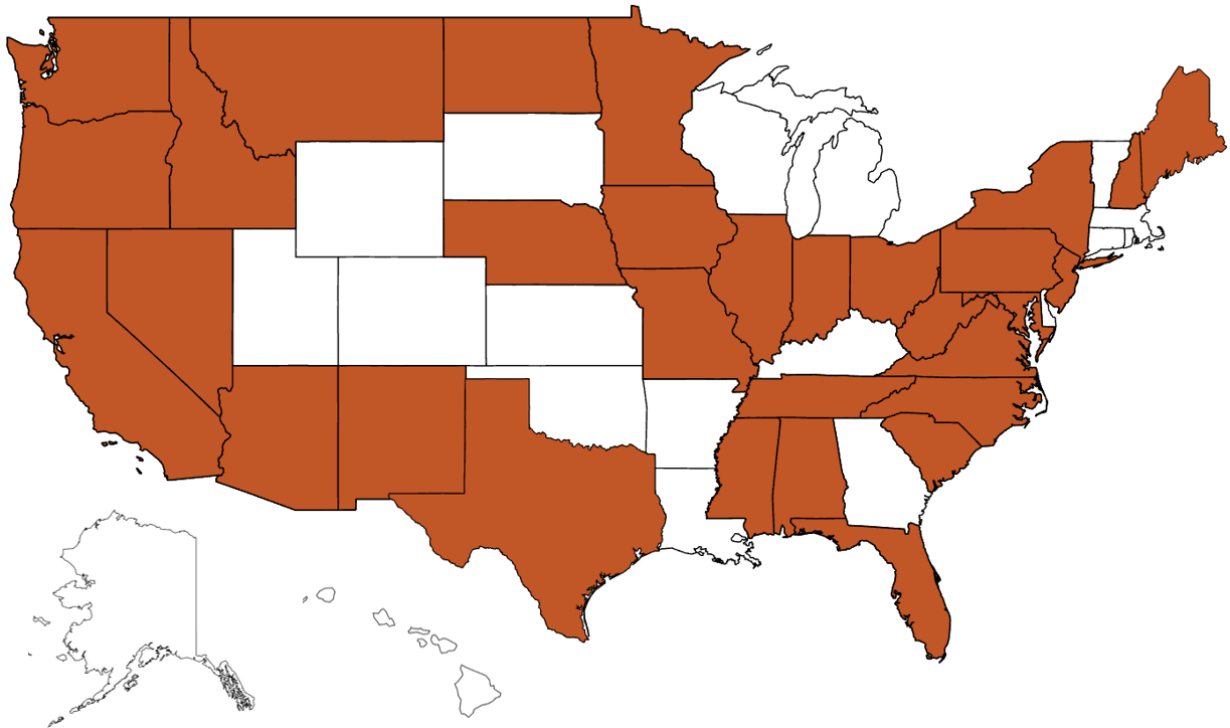
Observation 3

Tennessee continues to face challenges with railroad companies not repairing rail crossings

Tennessee participates in a nationwide program

As of fiscal year 2022, 30 states, including Tennessee, volunteered to participate in the State Safety Participation Program, partnering with the Federal Railroad Administration to perform crossing inspections. See **Map 2**.

Map 2
States Involved in the Federal Railroad Administration's State Safety Participation Program



Source: Federal Railroad Administration's website, Texas Department of Transportation's website.

What does Tennessee do to encourage railroad companies to make timely repairs to rough crossings to protect motorists?

"Under current state law, TDOT does not have adequate legal recourse to enforce State requirements on railroads without extensive effort. FRA has better means to enforce compliance of Federal regulations on railroads."

Source: Rail Safety Inspection Program Top to Bottom Review.

In Tennessee, for crossings in poor condition, if the railroad company does not make needed repairs, the department can choose to close the road, but only if the crossing is on a state route. To effectively close the portion of the state route, the department must have support from the community since that community will have to pay a portion of the costs related to the road closure. Closing a crossing means either removing the crossing altogether or altering the crossing to include an over- or underpass, which is the more expensive option.

According to Sections 65-11-107 and 65-11-109, *Tennessee Code Annotated*, the department could also order the elimination of a crossing, at which time the department would work with the railroad company to either move the crossing to a new location or alter the crossing. Alteration to a crossing can include removing the intersection of rail and highway by building an over- or underpass for the road.

According to the Freight and Logistics Director, the railroad companies will often provide funding to communities to help with alteration to a crossing to support safety.

Given that in Tennessee the department is already facing a backlog of projects and funding challenges, management has to consider the impact of taking on additional work projects related to railroad crossing closures or repairs **versus** seeking FRA's assistance in working with the rail companies to fulfill their responsibilities. See also **The Department of Transportation's Challenges for Tennessee's Infrastructure System** section for **Observation 2**, which discusses the department's growing project backlog, which dates back to 2014.

Without FRA intervention on behalf of the states, the department can take the railroad to court with a "show cause" case, defined as a contested case hearing initiated before an Administrative Judge. The case must be filed by giving notice of charges against a railroad company. If a show cause case is successful, based on Section 65-11-102, *Tennessee Code Annotated*, the railroad company can face fines of **up to \$100**.

The cost of closing a crossing can range from as low as \$200,000 to millions of dollars depending on whether an over- or underpass is added.



Source: Obtained from the Freight and Logistics Director.

During our audit period, from July 1, 2019, through June 30, 2023, the department did not initiate any show-cause cases against any of the railroad companies operating in Tennessee. To further complicate management's ability to pursue actions with the rail companies, as we reported in **Finding 3**, management cannot determine how many poor-rated crossings remained unrepaired due to RRSIS system limitations. **Without documented evidence for the number of unrepaired rail crossings in Tennessee and communication with railroad companies, management has limited information to encourage railroad companies to repair crossings that pose a risk to public safety and property.**

According to management, because of the low fine and the excessive amount of work required for a show cause case, this option is a last resort. Instead, management has focused on building their working relationships with the railroad companies to encourage cooperation and timely repairs. Management explained that with their only legal option being to pursue a show cause case and the low fine associated, this would likely damage the rapport they have built with the companies and could potentially lessen their cooperation and decrease repairs.

How other states manage their crossings, which could be options for Tennessee

We performed research on other states' laws concerning their requirements for railroad crossings and found that some states are managing their rail crossings in different ways that the department might consider for Tennessee. We noted the following different state laws regarding crossings that could be considered:

- Louisiana, Massachusetts, and Minnesota require their departments of transportation to perform an annual crossing inventory that lists dangerous crossings that should be targeted for closure or alteration of the crossing into an over- or underpass.
- Louisiana, Maryland, and New Jersey can perform the work on the crossing and then charge the railroad company for the cost after the repairs are complete.

Many states have laws like Tennessee that allow the state to require the crossing to be eliminated, altered, or moved if it is a danger to public safety. The cost of eliminating, altering, or moving a crossing is shared differently depending on the state. Some state laws allow for the cost to be split between the state and the railroad company equally, while other state laws require the railroad company to pay for the total cost or a percentage of the total cost.

Recommendation

The Commissioner should continue to seek ways to encourage railroad companies to take responsibility for repairing rail crossings that pose risks to Tennessee's motorists. Management should consider creating an annual crossing closure plan to identify dangerous crossings, including crossings that have not been repaired and crossings that may need to be closed or altered, and continue to work with the local communities toward closure of the dangerous and blocked crossings identified in the plan. With sufficient evidence, management is better able to pursue remedies through the Federal Railroad Administration and applicable railroad companies.

Management's Comment

We concur. There are some issues where the railroads do not provide repairs to rail crossings in a timely manner. Our relationships with the railroad and its employees allow us to get the plan and the rail workers usually hold true to the plan. Railroads will usually repair a series of crossings in a row when they have a work project planned. For example, we identified a crossing rated as "poor". We spoke to the roadmaster at the railroad and were advised they would be doing a crossing project at the

crossing within the next 3 months. The crossing was repaired within the timeframe as needed. If we had pursued a “show cause” for that crossing because they didn’t repair the crossing in a timelier manner, we would lose the relationship we have with that roadmaster and their coworkers. We would prefer to have the repairs made immediately but don’t see how that is possible. Even if we did a show cause case, by the time we had a judgement against the railroad the repair would probably be made. At certain times of the year, asphalt companies are closed, and timely repairs cannot be made due to the asphalt needed to repair the crossings is not available.

Emerging Issue 2

Railroad crossings blocked by trains for extended periods of time are a safety issue gaining attention nationwide

What is Tennessee doing to address and prevent blocked crossings affecting public safety?

Blocked railroad crossings are instances where a train is stopped, blocking a highway-rail crossing so that motorists and pedestrians cannot use it, as shown in **Figure 18**. Blocked crossings are dangerous because individuals may be tempted to crawl between stopped railcars and be injured if the train begins to move unexpectedly. Also, communities and citizens may be critically affected when police and emergency services are prevented from or delayed in reaching their destinations.

Figure 18
Enhanced Crossing Blocked by Train



Source: Photo taken by auditor.

In 2019, the Government Accountability Office (GAO) released a report about the increasing length of freight trains. Railroad companies are creating longer and longer trains to increase efficiency and decrease cost; some of these trains have grown to be more than three miles long. Longer trains may also increase the number of crossings blocked concurrently and negatively affect first responders and motorists attempting to find alternative routes. Moving a long train blocking a crossing can also be difficult because the train has more railcars, and the railroad engineers will need more time to locate and repair mechanical issues because they inspect each railcar. Additionally, GAO explained that longer trains also create other safety concerns, such as whether the brakes work as effectively given the length of the train.

In 2014, GAO released a report that found that the increasing trends in freight movement can worsen congestion issues in communities across the United States. In GAO’s 2019 report, the FRA confirmed that complaints about blocked highway-rail grade crossings have increased in recent years. Additionally, the FRA stated that it expects that the continued growth in rail and highway traffic will increase the number of blocked crossings and the risk of grade-crossing accidents.

While there are no state or federal laws penalizing railroad companies for blocked crossings, the FRA compiles reports of blocked crossings and publishes these statistics. **Tennessee has a total of 2,727 crossings.** See **Table 14** for the number of **blocked crossings reported in Tennessee** from July 1, 2020, through June 30, 2023.

Table 14
Blocked Crossings Reported to Federal Railroad Administration
(unaudited)

State	FY 2020	FY2021	FY 2022	FY 2023
Tennessee	34	669	1,343	1,003

Source: Created by auditor based on data from the Federal Railroad Administration system.

In 2022, the 112th Tennessee General Assembly passed **Public Chapter No. 178**, which requires the department to report to the House and Senate transportation-related committees the number of blocked crossings reported to FRA. In the report, the department must identify areas in the state where blocked crossings impacted commerce or created public safety risks. The department must also provide a copy of the report to the top five municipalities with the greatest impact from blocked crossings. The department provides the report in November each year.

In understanding Tennessee’s rail system, we also learned that members of the U.S. Congress have introduced bills prohibiting trains from blocking crossings for longer than 10 minutes unless due to mechanical or technical issues. In response, the Association of American Railroads said regulations

like this would “lead to unintended consequences, including network congestion and reductions in service.” As of September 2023, none of these bills have passed.

Because the FRA is the agency with authority to regulate railroads, in 2021, they introduced the Railroad Crossing Elimination Grant Program. These grants are aimed at modifying public at-grade highway-rail crossings to an over- or underpass style so that traffic and the railroad do not interact. According to the Freight and Logistics Director, local communities often have trouble funding their share of the crossing alteration projects despite the funding provided by the grant program, causing fewer of these projects to be approved.

As of September 2023, the City of Cleveland (in Tennessee) has received \$27,483,694 in grant funds from this program to separate a crossing within the city. The proposed project will fund project development, final design, right-of-way acquisition, and construction to replace the at-grade crossing on 3rd Street Southeast with a grade-separated flyover bridge, which will help eliminate potential conflict between rail and roadway users, improve reliability for freight rail traffic, reduce travel time for vehicular and non-motorized travelers, and eliminate blocked crossings. While the department wrote a letter of support for this project to the FRA, the department is not financially responsible for the project; the funding was received by the City of Cleveland, and the community will manage the project.

States face uncertainty when imposing regulations on railroad companies

Because railroad companies participate in interstate commerce, there are questions regarding who has the authority to regulate the industry. In August 2022, the Supreme Court of Ohio ruled that the federal government’s authority preempted Ohio’s statutory ability to regulate blocked crossings. The State of Ohio has since filed a petition for the United States Supreme Court to issue an opinion on the matter. According to management, until this is addressed on the federal level, the department faces limited options in addressing this issue.

Management’s Comment

We concur. Blocked railroad crossings are a national issue, and all states are trying to deal with this subject. Some states have billed the railroad for blocked crossings and railroads have taken the issue to the Federal level. As of this time, a railroad has never paid a blocked crossing fine in any state. State law in Tennessee does not have a fine associated and so it is not enforceable. It is important to note that when a crossing is blocked TDOT has added a report to their website so people can report the issue. We tabulate this information every year and submit it to the House and Senate in the Tennessee legislature for the top blocked crossings, which is due November 1 and currently required by state law.

Rest Area System

We examined the Department of Transportation's responsibilities for welcome centers and rest area facilities, known as the state's rest area system. Our goal was to determine how well the department maintains the rest area system for motorists. We also reviewed management's reimbursement process for costs related to the rest area system.

The department should evaluate its operation of the rest area system while remaining cognizant of issues such as aging facilities and the nationwide shortage of safe parking for commercial motor vehicles. Additionally, the department must establish adequate fiscal controls over its reimbursement process for welcome center costs. See **Finding 4**, **Observation 4**, **Finding 5**, **Matter for Consideration**, and **Emerging Issue 3**.

General Background

The state's welcome center and rest area facilities, also known as the rest area system, are integral to the department's mission to provide a safe and reliable transportation system for people, goods, and services

Because rest area system facilities are built on interstate rights-of-way, the Department of Transportation (the department) has always been involved with the operation of the facilities. According to the department, in 1983, former Governor Lamar Alexander signed Executive Order No. 36, which transferred the rest area system to the Department of Tourist Development (Tourist Development). Even after this transfer of functions to Tourist Development, the department was still paying the cost of operating the facilities. Then, in 1991, then Governor Ned McWherter signed Executive Order No. 44,⁴⁸ which gave the Department of Transportation full responsibility for operating and maintaining the state's 19 rest areas and 12 welcome centers. Although all functions of the operations of these facilities were transferred by Executive Order to the department, Section 4-3-2204(b),⁴⁹ *Tennessee Code Annotated*, remained in effect and stated that Tourist Development will supervise welcome centers.

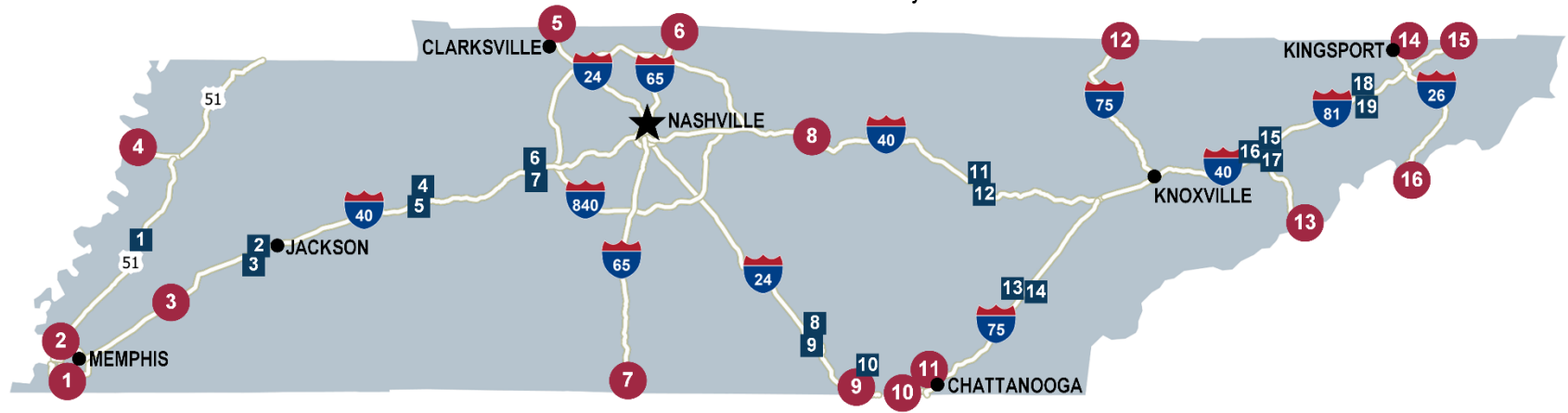
⁴⁸ The Executive Order stated that Tourist Development was still responsible for the operation of the Smith County Welcome Center and did not transfer this facility to the department. The Executive Order did not provide a reason for this exception.

⁴⁹ Section 4-3-2204(b) was established in 1937 and last amended in 1976.

In 2023, Tennessee’s rest area system has grown to 35 facilities across the state, comprised of 19 rest areas and 16 welcome centers. These 35 facilities are located along interstates, near interstate borders, and, in one instance, on a state road,⁵⁰ as shown in **Figure 19**. They provide 24-hour, safe, and reliable locations for motorists to rest for two-hour increments, including bathrooms, vending machines, tourist information, weather and traffic information, and a place to walk with pets. Welcome centers provide even more travel amenities, which include art and cultural exhibits to highlight Tennessee’s heritage and endeavors. **Executive Order No. 44 from 1991 is still in effect and was never codified in state statute.** Because of this, the department and Tourist Development have operated based on verbal agreements since 1991.

⁵⁰ One rest area is in Lauderdale County, located off US-51, a state road.

Figure 19
Tennessee's Rest Area System



Welcome Centers

- | | |
|--------------------------|-------------------------|
| 1 I-55 Shelby County | 11 I-75 Hamilton County |
| 2 I-40 Shelby County | 12 I-75 Campbell County |
| 3 I-40 Haywood County | 13 I-40 Cocke County |
| 4 I-55 Dyer County | 14 I-26 Sullivan County |
| 5 I-24 Montgomery County | 15 I-81 Sullivan County |
| 6 I-65 Robertson County | 16 I-26 Unicoi County |
| 7 I-65 Giles County | |
| 8 I-40 Smith County | |
| 9 I-24 Marion County | |
| 10 I-24 Hamilton County | |

Rest Areas

- | | |
|-----------------------------------|---------------------------------------|
| 1 US-51 Lauderdale County | 11 I-40 Cumberland County (Westbound) |
| 2 I-40 Madison County (Westbound) | 12 I-40 Cumberland County (Eastbound) |
| 3 I-40 Madison County (Eastbound) | 13 I-75 McMinn County (Southbound) |
| 4 I-40 Benton County (Westbound) | 14 I-75 McMinn County (Northbound) |
| 5 I-40 Benton County (Eastbound) | 15 I-81 Jefferson County (Southbound) |
| 6 I-40 Dickson County (Westbound) | 16 I-40 Jefferson County (Eastbound) |
| 7 I-40 Dickson County (Eastbound) | 17 I-40 Jefferson County (Westbound) |
| 8 I-24 Grundy County (Westbound) | 18 I-81 Greene County (Southbound) |
| 9 I-24 Grundy County (Eastbound) | 19 I-81 Greene County (Northbound) |
| 10 I-24 Marion County (Eastbound) | |

Source: Auditor generated based on welcome center and rest area information provided by department management.

Day-to-day operations of the welcome centers and rest areas and funding of operational and maintenance costs

The department receives state appropriations to fund⁵¹ **all the state's maintenance activities**, which include the operation and maintenance of the rest areas and welcome centers; for fiscal year 2023, the department received an annual appropriation of **\$407,591,269** for maintenance⁵² of the state's entire transportation system.

Because the department cannot fully anticipate the maintenance needs for the state's transportation system in any given year considering external factors such as the weather, road wear and tear, and other unforeseen events, the department's overall maintenance budget has increased flexibility to meet maintenance needs as they are identified. If additional maintenance needs arise in excess of the current budget, such as emergency repairs to fix a landslide covering an interstate, the department can use funds budgeted for new construction projects to fund and complete maintenance activities. According to department management, keeping all the state's transportation assets in a state of good repair is the department's first priority.

As noted above, state law still includes Tourist Development's responsibilities to **supervise the state's welcome centers**. Tourist Development prepares the estimated welcome center operation and maintenance budget needs each year so that Department of Transportation management can include these costs in its overall maintenance budget.⁵³ Monthly, Tourist Development bills the department for expenditures related to operating, inspecting, and maintaining the welcome centers, and the department reimburses Tourist Development from the overall maintenance budget.

For **rest areas**, the department contracts with a **third-party vendor**, Community Rehabilitation Agencies of Tennessee (CMRA), for basic maintenance, daily oversight, and frequent inspections. The department's employees are responsible for major maintenance projects for all facilities.

The actual expenditures for both welcome centers and rest areas for the last four fiscal years are in **Table 15**.

⁵¹ Federal funding is available for other maintenance tasks but can only be used at rest area system facilities for limited projects related to the interstate system ramps.

⁵² The department's maintenance budget includes preventive and reactive measures to prolong the use of the state's transportation assets. Typical maintenance activities include salting roads before severe cold weather, mowing interstate and state highways, replacing guardrails, patching potholes, and resurfacing and repairing roadways.

⁵³ We noted that for fiscal year 2023-2024, Tourist Development's other division, the Administration and Marketing Division, received almost \$51 million in state and federal appropriations. This division is responsible for planning, managing, and implementing marketing programs that increase travel to Tennessee and support tourism development initiatives.

Table 15
Actual Expenditures for Rest Areas and Welcome Centers for
Fiscal Years 2020 to 2023

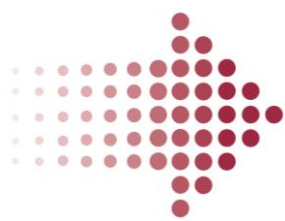
Year	Welcome Centers	Rest Areas
2020	\$8,603,114	\$4,257,048
2021	\$8,795,869	\$4,367,046
2022	\$9,207,979	\$4,820,109
2023	\$9,837,056	\$5,312,317
Total	\$36,444,017	\$18,756,520

Source: The department's Transportation Manager 2 and Edison, the state's enterprise resource management system.

Facility inspections are performed quarterly for rest areas and semi-annually for welcome centers

The department's facilities manager explained that he is solely responsible for performing facility inspections to ensure all parties are maintaining the facilities in the rest area system. He also stated that he reviews the monthly inspections conducted by Tourist Development and CMRA. The facilities manager uses an inspection form that contains a grading scale of either "Excellent, Good, Moderate, or Fail" or "Pass/Fail." The form addresses items like maintaining the grounds, picnic areas, restrooms, exterior structures, and the main building, and has a comment section for other items. The facilities manager explained that when he identifies maintenance needs during an inspection, he has the facility supervisor,⁵⁴ who is responsible for the day-to-day operations and basic maintenance of the facility, sign the inspection form to acknowledge required maintenance. The facilities manager maintains the inspection reports and saves them on the department's H drive. His follow-up is informal and handled through text, email, or phone calls to ensure during the next scheduled inspection that repairs have been made. **Based on our review, we found that management should improve their inspection process for both welcome centers and rest areas. See Finding 4.**

⁵⁴ The facility supervisor has the primary responsibility for maintaining the rest area or welcome center and can be Tourist Development or CMRA staff, depending on whether the location is a rest area or a welcome center.



Finding 4

Management did not oversee the work of the facilities manager and did not establish an effective monitoring process for ensuring that Tourist Development and the contractor maintained the rest areas and welcome centers in good working order

Because management has not developed uniform inspection forms and scoring criteria for inspections of the conditions at both the welcome center and rest area facilities, inspections were subjective and inconsistent

Based on our review of the inspection process, we found that the facilities manager has not developed a uniform inspection document for use by both the welcome center and rest area inspectors. According to the facilities manager, he and the CMRA contractor use the same inspection form for the rest areas, but Tourist Development uses a different inspection form for welcome centers. While these forms assessed many of the same elements at the facilities, Tourist Development's inspection form included additional criteria based on its own initiatives at the welcome centers, such as conditions of the Civil War display and availability of brochures. To ensure facilities are inspected consistently, management should develop a **uniform inspection form**, which also facilitates quick management review and setting corrective action goals for facilities with deficiencies.

Additionally, we found that the facilities manager has not developed **uniform scoring criteria** as guidance to inspectors. For example, the facilities manager explained that when conducting inspections, he grades the facilities from a motorist's perspective. Because of the subjective nature of this approach, other inspectors would likely have a different interpretation and score the facilities according to their own level of acceptance. In addition, given the facility amenities, such as multiple sinks, hand dryers, and lights, uniform scoring guidance would provide inspectors with a clear expectation for the facility's overall condition.

The facilities manager could not provide evidence that he reviewed inspections performed by Tourist Development and CMRA to ensure they were conducted and if results identified basic maintenance issues or repairs that required the department's involvement

From our review of 35 inspections⁵⁵ performed by Tourist Development, the CMRA contractor, and the department's facilities manager, we noted issues with inconsistent information documented on inspection reports **for the same facility**. Because the department does not have a documented review process to compare the department's inspection report to the most recent inspection performed by Tourist Development or the contractor, including documenting any

⁵⁵ These inspections were performed from January 10, 2023, through June 22, 2023.

differences in the results of the inspections and the reasons for the differences, the facilities manager could not explain the nature of the inspection report differences and whether facilities with deficiencies were still awaiting repairs. We found the following inconsistencies:

- For 13 facilities, the department's facilities manager did not ensure the facility supervisor signed the inspection form to indicate they were aware of the maintenance issues identified.
- For two facilities, the department's inspection reports noted multiple issues for the Eastbound and Westbound rest areas. CMRA's inspector performed their inspection the following day and only reported one issue for both facilities, in conflict with the multiple issues noted by the department's inspector. CMRA's inspection reports also noted the exact same issues on the same date for the Eastbound and Westbound rest areas.
- For three facilities, the facilities manager noted issues that needed repairs; when Tourist Development inspected the same facilities 28 to 35 days later, they noted the same issues, indicating that the facility supervisor made no repairs in response to the department's inspection report.
- For five facilities, the facilities manager did not fully complete some parts of the inspection forms, such as checking to ensure that wastewater permits and fire extinguishers had not expired. CMRA noted that four of the five facilities had expired fire extinguishers or wastewater permits, while the facilities manager did not make note of that in his inspections.
- For five facilities, the inspection reports were significantly different concerning the maintenance needs or concerns. Specifically, we noted that the department's facilities manager inspected the Greene County (Southbound) rest area on February 22, 2023, and did not note that any repairs were needed. CMRA inspected the same facility on February 24, 2023, and noted that the parking lot lights were out, and a toilet and urinal were out of order. See the urinal and sign pictured in **Figure 21**. During our site visits between February 22, 2023, and April 29, 2023, we noted many of the same issues had not been addressed.

Information obtained from inspections provides an assessment of a facility's condition, its ongoing maintenance, and major maintenance needs to decision-makers. **Management's current process, however, does not ensure that all maintenance needs were reported and most importantly that the facility deficiencies were repaired.** According to the facilities manager, **follow-up documentation on repairs was not maintained at the department level because repairs and maintenance are often informally handled via texts and phone calls with supervisors at the facilities.**

The department's facilities manager could not provide evidence of rest area and welcome center closures, including reasons for closure, length of the closure while awaiting repairs, or that repairs were made

According to the department's facilities manager, when repairs are needed at the rest area and welcome center facilities, facility supervisors are required to inform the department to request approval to close the whole facility or just the public restrooms. The facility supervisor can request this approval by phone or through email. According to the facilities manager, if the facility needs to be closed for extensive repair, then the public will be informed through the SmartWay application, and a message board will be set up on the interstate within a mile of the facility's interstate exit ramp to inform the public of the closure.

The facility manager stated that short-term closures happen more often and that wastewater issues have plagued some of the more rural facilities. Wastewater closures involve collaboration with the community and possibly utility companies that must deal with sewer systems and moving sewage to the main sewer lines, and in some cases, those pipes can be miles long. **We requested a list of facility closures for our audit period and found that management does not track or maintain facility closure information. As such, management could not provide information as to the frequency of rest area closures, and without that critical information, management cannot be sure facility deficiencies and closures are addressed quickly to minimize the impact on the traveling public.**

We asked the Transportation Manager 2 how often facilities have been closed for repairs, and he provided the following recent examples.

- The department closed the Haywood County Welcome Center to repair the main sewage line, which ruptured, requiring major repairs. The department approved closing the restrooms for one weekend and the rest of the facility remained open. A message board was provided by the department to explain to motorists that the restrooms were closed.
- The department closed the Dickson County Rest Area for an extended period related to wastewater issues. According to management, the sewage pump broke, and due to supply chain issues, the repair was significantly delayed.
- The Transportation Manager 2 also noted that the I-81 South (Greene County) rest area has been plagued by people repeatedly flushing clothes down the toilets causing regular short-term closures at the facility.

Due to lack of documentation, we could not determine if facility supervisors reliably reported short-term closures to the department for approval. As a result, department management may not be aware of all facility closures, especially if other parties are required to perform the repairs.

In general, rest areas are not as well maintained as welcome centers

We performed site visits of all welcome center and rest area facilities between February 22, 2023, and April 29, 2023, and we found that all facilities were open and staffed. During these visits, we made notes on the general conditions of the facilities, including conditions of the restrooms, vending areas, parking lots, and building structures. See **Figure 20** for an example of a rest area and a welcome center.

Figure 20
I-81 Greene County Rest Area Southbound (Left) and I-40 Smith County Welcome Center



Source: Photos taken by auditors.

During our site visits, we found that the rest area conditions varied; some facilities had minor maintenance issues, such as on the left in **Figure 21**, where a broken handicap parking sign remains on the ground. Other facilities had more serious issues, such as on the right in **Figure 21**, where a major restroom fixture was missing, and the other fixture was unusable (photo censored). Additionally, we noted that some facilities had grimy floors with discoloration from missing grout, or paper products scattered across the floors.

As shown in **Figure 22**, the women's restroom at the Jefferson County (Eastbound) facility had two unusable sinks that appeared to be in a state of prolonged disrepair.

Figure 21

Handicap Sign on the Ground
at the I-40 Dickson County
(Westbound) Rest Area



Men's Restroom at the
I-81 Greene County
(Southbound) Rest Area



Source: Photos taken by auditor.

Figure 22

Women's Restroom Sinks at the I-40 Jefferson County (Eastbound) Rest Area



Source: Photos taken by auditor.

Management's oversight is important for ensuring the state's rest area system is well-maintained

Without documented policies and procedures for the daily operations of these facilities, department management cannot ensure that Tourist Development and the rest area contractor have sufficient guidance to provide safe and clean facilities for Tennessee travelers. In addition, without good stewardship over the state's welcome centers and rest areas, including a formally defined standard for operating and maintaining these facilities, management cannot ensure the state's rest area system will remain a viable infrastructure. The U.S. Government Accountability Office's *Standards for*

Internal Control in the Federal Government (Green Book), Principle OV1.03, “Fundamental Concepts of Internal Control,” states,

Internal control comprises the plans, methods, policies, and procedures used to fulfill the mission, strategic plan, goals, and objectives of the entity. Internal control serves as the first line of defense in safeguarding assets. In short, internal control helps managers achieve desired results through effective stewardship of public resources.

We also noted that the department had not assessed risks or identified the risks noted in this finding in management’s Financial Integrity Act Risk Assessment; see the **Risk Assessment** section, **Finding 6**.



Recommendation

The Commissioner should evaluate the department’s responsibilities and resources for the rest area system to ensure that department management and staff can provide the needed oversight. Department management should develop a uniform inspection form and scoring criteria, ensure that repairs are identified and fixed, document their review of inspections performed, track facility closures, and develop policies to guide staff or contractors tasked with the day-to-day oversight of the welcome centers and rest areas.

Management’s Comment

We concur. Management does not have an official monitoring process in place to ensure rest areas and welcome centers are maintained in good working order. TDOT will work to develop a thorough process that documents each work request through a work order process through close out. The process will ensure that all measures are in place to document the repair for all rest areas and welcome centers. TDOT will also work to standardize all inspection forms for both rest areas and welcome centers for all parties that may be inspecting the facilities regardless of them being a staff member of TDOT, Tourism, or a third party.

Observation 4

Tennessee's rest area system facilities are aging, and the department lacks the maintenance expertise for many repairs

Our inquiry and review showed that most welcome centers were constructed or renovated more recently than rest area facilities. Management provided dates that showed that the department built or renovated 10 of the 16 welcome centers in the last 25 years. The remaining six facilities were constructed between 1978 and 1996. Management was unable to provide dates for the construction or renovations for the rest areas but estimated that most were constructed in the 1970s. Based on our research into rest area system facilities nationwide, many were constructed at the same time as the interstate, largely in the 1960s and 1970s. Although actual dates were unavailable, we found management's assertion that most facilities were constructed about 50 years ago plausible. While we were unable to determine whether the issues, we noted were due to a prolonged lack of maintenance or a facility reaching the end of its useful life, prompt maintenance is important to ensure aging facilities do not decline further and become unusable. Additionally, as these facilities continue to age, it is likely that maintenance needs may occur more frequently.

Because commerce surrounding interstates has grown so significantly since the construction of the interstate system, some states have begun to consider making changes to the use of rest area system facilities or even question the need for them at all. Media outlets report that these aging facilities and the cost of operations are two growing issues nationwide. California and Washington report similar concerns to those noted by department management that wastewater issues can cause costly problems and require lengthy closures. Although the department has a large Maintenance Division, the Assistant Chief Engineer of Operations explained that many of the maintenance issues at rest area system facilities are outside the expertise of the department's employees. The department's technicians are trained in roadway maintenance, not building maintenance. Because of this, the department is in the process of contracting with a state-approved maintenance company to complete maintenance activities for these facilities. If the department does contract the rest area system's maintenance to a third party, management's responsibilities change to contract oversight and monitoring the contractor's performance, both of which become vital to ensure the rest area system is sufficiently maintained.

The Federal Highway Act of 1956 led to the construction of the nation's interstate system and the recognition that motorists needed safe locations to rest. Over fifty years later, states face the growing question:

"Where do rest areas fit into the modern transportation system?"

Recommendation

Top department leadership should assess the department's operational responsibilities for all the facilities in the state's rest area system. The assessment should include

- evaluating the department's current policy, which imposes a two-hour parking limit at rest areas and welcome centers, to determine if the policy jeopardizes the truck drivers passing through the state;
- whether another state agency may be better suited to provide maintenance for and oversight of the facilities;
- public user satisfaction considering facility functionality and conditions;
- the cost of normal operation and routine and major maintenance of the facilities, including whether facilities have reached the end of their useful life and need renovation or reconstruction; and
- long-term goals for the state's rest area system.

Management's Comment

We concur. The department is working with a third-party management firm, JLL, that will assume responsibilities for these repairs in the future. JLL has the expertise and workforce to repair deficiencies at the rest areas.



Finding 5

Management did not establish a process for reviewing and approving the Department of Tourist Development's welcome center expenditures

Although the Executive Order transferred the rest area system and applicable staff to the department, the welcome centers' staff remained with Tourist Development, resulting in a lack of clarity in some areas of responsibility

Section 4-3-2204, *Tennessee Code Annotated*, states that Tourist Development is required to supervise the welcome centers in the state, but the statute was last revised in 1976. State statute does not define "supervise," so we were unable to fully determine the intent of, or the extent of, Tourist Development's responsibilities. In 1991, Governor Ned McWherter signed Executive Order No. 44 and transferred all responsibilities for overseeing the welcome center and rest area facilities to the Department of Transportation. This Executive Order states,

. . . all functions of the Department of Tourist Development with respect to the rest area system shall be administered by and shall be under the control of the Commissioner of Transportation. . . . The Commissioner of Transportation shall also perform the duties and have the responsibilities with regard to the rest area system and with the administration of the statutes pertaining thereto that were heretofore vested in the Commissioner of Tourist Development....

The Commissioner of Finance and Administration . . . shall cause to be transferred to the Department of Transportation, any filled or unfilled, authorized and funded positions assigned to the rest area system, together with any other employees of or positions of the Department of Tourist Development assigned primarily to provide support services to that system. . . .

During our initial discussions with the department and Tourist Development, neither department had a copy of Executive Order No. 44, nor could they explain why the Tourist Development welcome center staff were not transferred to Transportation. We obtained a copy of Executive Order No. 44 to help us understand who should have authority over the welcome centers and rest areas. With no agreement or policy between the department and Tourist Development, we were unable to determine the full extent of each department's responsibilities.

Although Executive Order No. 44 transferred welcome center operations and associated positions to the department in 1991, this transfer never happened. Because full execution of the executive order never occurred, the department, at a minimum, should have developed an interagency agreement with Tourist Development to establish clear guidance and expectations of responsibilities and allowable expenditures for the operation of the welcome centers.

Absent any agreement, Tourist Development has billed for discretionary expenses for which the department has paid without a formal review and approval process to ensure expenditures were appropriate, as described in detail below.

Department of Transportation management has not developed procedures to ensure expenditures for welcome center operations were appropriate and reimbursed Tourist Development for expenditures that were unrelated to the basic operation and maintenance of the welcome centers

Tourist Development incurs expenses for operating the welcome centers and then invoices the department monthly for these expenditures through Edison, the state's enterprise resource management system. The budgeted amount and actual expenditures billed to the department are shown in Table 16 for the last four fiscal years.

Table 16
Tourist Development Welcome Center Budgeted and Actual Expenditures for
Fiscal Years 2020 to 2023

Year	Budget	Actual	Under/(Over) Budgeted Amount
2020	\$8,879,500	\$8,603,114	\$276,386
2021	\$9,099,000	\$8,795,869	\$303,131
2022	\$9,258,000	\$9,207,979	\$50,021
2023	\$9,503,400	\$9,837,056	\$(333,656)
Total	\$36,739,900	\$36,444,018	\$295,882

Source: Actual expenses obtained through invoices provided by the department's Transportation Manager 2. Budgeted amounts obtained from FY2019-2020, FY2020-2021, FY2021-2022, and FY2022-2023 Tourist Development state budgets.

The transportation manager explained that when he assumed his current role, a former Assistant Director of Maintenance advised that he only needed to approve the monthly invoice for payment. Because of the lack of internal controls over the reimbursement process, we reviewed the monthly invoices submitted by Tourist Development and identified accounts that had activity when it did not clearly relate to a welcome center operational expense. After this review, we expanded our work and haphazardly selected expenditures from these accounts to review in Edison to determine their appropriateness as an expenditure for the operation of the welcome center facilities. We found questionable expenditures paid by the department as shown in Table 17. We did not make determinations regarding the allowability of expenditures incurred by Tourist Development because it is the role of department management to make these determinations before approving payment.

Table 17
Results from Expanded Testwork

Amount	Questionable Expenditures
\$72,797	Familiarization tours of the state to view museums, local tours, and restaurants for fiscal years 2020 through 2023; \$38,658 was spent in FY2022 alone.
\$51,994	Welcome Center Annual Manager Meetings hosted in Nashville for fiscal years 2020 through 2023.
\$10,000	Contractual agreement with the department in which Tourist Development agreed to pay a share of welcome center renovations and an art exhibit installation for fiscal year 2020. Tourist Development did not pay its share but billed it back to the department.
\$4,967	Out-of-state travel expenditures for fiscal years 2020 through 2023.
\$3,038	Penalties from late payments of utility and communication bills for fiscal years 2020 through 2023.
\$2,411	Staff to help at the Tennessee Sports Hall of Fame induction ceremony for fiscal year 2023.
\$1,623	Staff to attend the Governor's Conference on Hospitality and Tourism for fiscal year 2020.
\$1,285	Teambuilding exercises for Regional Managers at Top Golf for fiscal years 2022 and 2023 and an Escape Room for fiscal year 2023.
\$895	The Assistant Commissioner of Welcome Centers attended the 2022 AutoZone Liberty Bowl (college football game) to be an honorary co-captain for fiscal year 2023.
\$649	Expenses submitted by the Assistant Commissioner of Welcome Centers with no supporting documentation included for fiscal year 2023.
\$485	The Assistant Commissioner of Welcome Centers attended the Southern Heritage Classic (college football game) for fiscal year 2023.
\$467	The Assistant Commissioner of Welcome Centers attended an event for St. Jude for fiscal year 2023.
\$386	Breakfast and lunch for the Governor's Management Fellows for fiscal year 2023.
\$332	A goodbye luncheon for the former Assistant Commissioner of Marketing for fiscal year 2023.
\$151,329	Total Questionable Expenditures

Source: Edison, the state's enterprise resource management system.

We also noted that Tourist Development billed for several smaller miscellaneous expenses such as parking to attend a benefit concert at the Ryman, catered meals for employee appreciation events, and food and beverages for staff meetings.⁵⁶ During our review, we determined that most of the questionable expenditures were made by central office staff and not staff at the welcome centers throughout the state. Based on a discussion with Tourist Development, all expenses in Edison for welcome centers are automatically compiled and sent to the department each month. Because department management has not ensured the monthly invoices from Tourist Development are reviewed before approval, they have reimbursed expenses unrelated to a welcome center's daily operations.

Establishing an effective internal control system is crucial to an entity achieving its objectives. Internal controls can help prevent errors, control spending in accordance with budgetary limits, and ensure corrective action is taken on noted issues. Green Book Principle 10.01, "Design Control Activities," states, "Management should design control activities to achieve objectives and respond to risks."

We also noted that the department had not assessed risks or identified the risks noted in this finding in management's Financial Integrity Act Risk Assessment. See the **Risk Assessment** section, **Finding 6**. When department management does not monitor spending activities, it reduces the amount of funds available for the department to perform maintenance activities for the state's infrastructure. Additionally, without effective controls over the reimbursement process, and subsequent detective controls to alert management to any potential fraud, errors, or irregularities, the risk of fraud, waste, and abuse increases.

Action Taken by Management

When we brought this issue to management's attention, management explained that they have requested additional information from the Department of Tourist Development and are working to develop a new process to review detailed expenditure information prior to approval.

⁵⁶ Our work focused on the department, so we did not review all transactions submitted for reimbursement by Tourist Development. Because of this, we could not determine the total amounts, but we have included the transactions above as examples of expenditures for the operation of the welcome centers that the Department of Transportation reimbursed.



Recommendation

The Commissioner should seek clarification on the department's responsibility for the rest area system and ensure the department is meeting these responsibilities as outlined in the executive order. Until clarity is provided on rest area system responsibilities, department management and Tourist Development should continue to work together to ensure an inter-agency agreement, such as a Memorandum of Understanding, is executed so that each party's responsibilities and costs are clearly defined and memorialized.

The Commissioner should ensure management develops and implements departmental policies and procedures to guide staff tasked with rest area system responsibilities.

Management's Comment

We concur. The department used an established legacy process of reviewing, not to exceed annual ceiling, against regular monthly invoicing. TDOT has been working with Tourist Development to establish a process for the review and approval of expenditures for a few months. TDOT will work with Tourist Development to develop a process in pursuit of a separation of accounting to support direct cost expenditures and a percentage of indirect costs.

Matter for Consideration

Management should consider clarifying options for the state's responsibilities for welcome centers and rest areas.

Given that Section 4-3-2204, *Tennessee Code Annotated*, does not define either party's responsibilities for rest areas and welcome centers, the law has been supplemented with Executive Order No. 44 in 1991, which gives the Department of Transportation responsibility. Since the Department of Transportation's authority, as provided by the 1991 executive order, was never fully implemented by department leadership, both the Department of Transportation and the Department of Tourist Development have performed specific responsibilities in the operations of the welcome centers and rest areas since then.

Management has documented expectations for rest area facilities in its vendor contract with CMRA and determined that the next step to ensure welcome center facilities have clear guidance and expectations for their roles and responsibilities is to create an agreement with the Department of

Tourist Development. As of November 2, 2023, the department is still working on a draft agreement with the Department of Tourist Development. Because the department's responsibility for rest areas and welcome centers is not defined in statute, management may wish to consider whether they should also consult with the General Assembly to determine if a change to the existing statute is needed.

Management's Comment

We concur. TDOT has been diligently working with the Department of Tourist Development to formalize an agreement of responsibilities between both parties. The first steps have been taken to develop an Interagency Agreement which will document roles, responsibilities, and cost. A draft scoping document for Welcome Centers has been sent to Tourism for review and we have had two meetings with them as we seek to finalize the interagency agreement for Commissioner signatures. There is an existing scope of service document that TDOT uses for rest area operations that define state responsibilities and third-party contractor (CMRA) responsibilities. TDOT will review and refine this document to provide better clarity for all parties.

Emerging Issue 3

Nationwide concerns surrounding the sufficiency of safe parking for commercial motor vehicles also impact Tennessee's goal to provide safe parking for commercial motor vehicles

The U.S. Department of Transportation (USDOT) has acknowledged the lack of safe parking for commercial motor vehicles nationwide

In 2022, truck drivers reported available overnight parking as their top industry concern, with trucking companies reporting the same as their 10th biggest concern. Many factors contribute to this problem, including the rising cost of real estate at interstate interchanges and low capacity in existing areas.

The Moving Ahead for Progress in the 21st Century (MAP-21) Act included provisions to help address the shortage of safe, overnight parking for Commercial Motor Vehicles (CMVs). This act authorized projects that address the shortage of safe truck parking as eligible spending activities for the Surface Transportation Block Grant Program and the National Highway Performance Program, which are two of the department's largest federal funding grants. The MAP-21 Act also created "Jason's Law." According to the Federal Highway Administration's website,

Jason's Law is named in honor of Jason Rivenburg. On March 5, 2009, Jason stopped for a delivery in Virginia and then headed toward a delivery destination in South Carolina. While only 12 miles from the delivery location, he needed to find parking to rest through the night

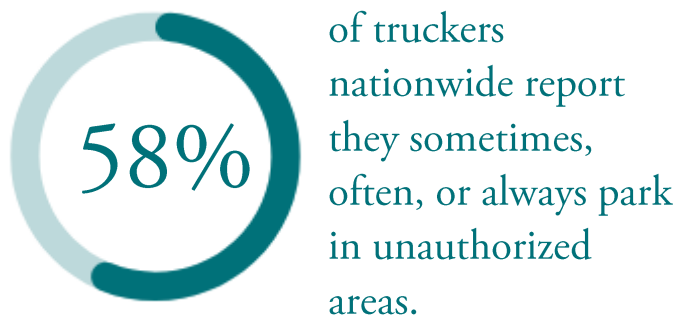
as his arrival location was not yet open to receive deliveries. Jason did not have a safe place to park. Jason had learned from truckers familiar with the area that a nearby abandoned gas station was a safe location to park and proceeded to park there for the night. Tragically, he was attacked and murdered at this location while he slept, with his killer taking both his life and just \$7.00 that he had in his wallet.

Jason's Law requires USDOT to conduct a survey and make the results public to bring national attention to this issue. The survey is meant to

1. evaluate each state's capacity to provide adequate parking for interstate CMVs,
2. assess the volume of CMVs in each state, and
3. develop metrics to measure each state's adequacy in providing CMV parking facilities.

The USDOT published a 2019 survey of overnight parking facilities on the national highway system, which included all rest area system facilities in Tennessee. **As of August 2023, the department has set a two-hour parking limit for all vehicles at these facilities, with multiple signs stating this limit in parking areas.** Department management stated this limit was intended to prevent camping at the facilities and acknowledged that the policy was not consistently enforced, especially for CMVs. **In addition, the survey listed rest area system facilities, truck-only parking locations with no facilities, and weigh-scale complexes. In total, these 58 locations provide 1,084 truck parking spaces.** A 2020 research study conducted by the University of Memphis identified 112 private truck stop facilities in the state, such as Pilot Travel Centers and Love's Travel Stops.

Exhibit 13 Unauthorized Parking by CMVs



Source: The American Transportation Research Institute's "Mid-America Association of State Transportation Officials Truck Parking Survey Analysis May 2018."

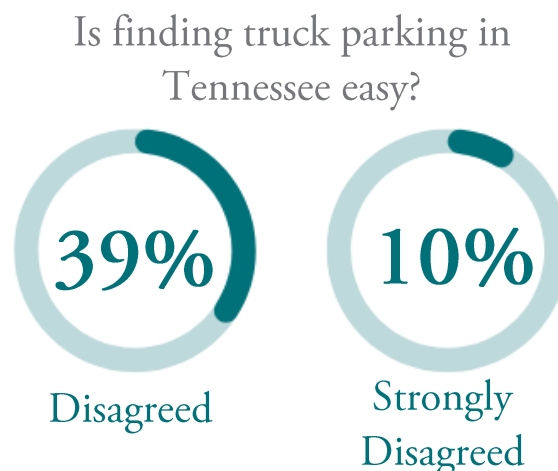
A lack of CMV parking not only creates frustration and danger for truck drivers but also increases the danger to other motorists. When parking is unavailable, drivers may remain on the road in drowsy conditions and exceed the legal limits on driving time. Additionally, drivers may use exit ramps or roadway shoulders to park, creating a safety hazard and increasing the risk of property damage. An American Transportation Research Institute survey analysis stated **that 70% of truckers report spending 15 minutes**

to one hour finding overnight parking, with over half of drivers finding parking in unauthorized locations, as shown in Exhibit 13.

Respondents in the University of Memphis's study⁵⁷ echoed similar statements, with only 13% of truckers stating they often or always can find parking at public rest stop areas. While more than 50% of truckers also reported that parking is always, often, or occasionally only available in unsafe locations in Tennessee. Also, only 17% agreed that finding parking for mandatory breaks was easy. See Exhibit 14. Additionally, 37% stated that finding parking in surrounding states was easier.

This study also predicted future truck parking demands in Tennessee and used the Federal Highway Administration's methodology to calculate this demand. Based on projections of truck transport growth in coming years, the study recommended capacity upgrades for 15 of the existing rest area system facilities and the construction of 2 new facilities in the state to meet CMV overnight parking demands. Both recommended locations for new facilities are in areas where a rest area system facility exists in only one direction. The recommended locations are I-155 southbound near mile marker 9 and I-40 eastbound/I-81 northbound.

Exhibit 14
Ease of Finding Truck Parking in Tennessee



Source: The University of Memphis's "Truck Parking Needs in Tennessee" study.

The department's 2023 Statewide Multimodal Freight Plan includes the issue of truck parking

The U. S. Department of Transportation requires the department to create the Statewide Multimodal Freight Plan to qualify for extra federal funding. The plan's purpose is to support its strategic goals for the freight system, to develop strategies to meet these goals, and to identify projects to include in its Statewide Transportation Improvement Plan, which is required to receive federal funding. The state created the first plan in 2016 and released an updated plan in 2023. This plan recognizes the importance of the freight system throughout Tennessee and how to ensure infrastructure can meet the needs for freight movement in the coming years.

The department identified the shortage of safe truck parking locations in the state as an issue impacting highways and roads and explained that the cost of adding additional parking had the biggest impact on the department's ability to address the issue. To help understand this issue and determine ways to address it, the department has worked with universities in Tennessee, such as the 2020 study

⁵⁷ The University of Memphis partnered with the American Transportation Research Institute, which obtained responses from truck drivers. While 486 individuals responded to the survey, only 311 met the requirements and completed the survey. The 311 surveys were then analyzed.

completed by the University of Memphis. These projects studied truck parking throughout the state, areas with truck parking shortages, including causes for the shortages, and illegal parking by CMVs. By using this data, the department identified the need to provide more up-to-date information on truck parking in its Statewide Multimodal Freight Plan. This could include using intelligent transportation system technology or smartphone applications to provide the number of available spaces at public locations. Additionally, in 2022, the department received a grant to create 125 additional parking spaces off I-40 in Smith County. The department is currently undergoing a project to further explore the possibility of expanding 20 additional locations, such as rest areas or weigh stations, to increase the number of parking spots; this project is expected to be completed by mid-2024.

Additional measures are available to increase the safety and number of truck parking spots at welcome centers and rest areas

While the need for more overnight truck parking is not new to the transportation industry, its importance continues to increase as the number of CMVs using the nation's transportation system grows larger. The Federal Highway Administration hosted a rest area forum in 1999, which offered potential solutions to a lack of available truck parking at public rest area system facilities, including

- increasing law enforcement presence;
- redesigning landscaping and lighting;
- eliminating parking time limits under 8 hours for CMVs;
- raising the priority of rest area facility construction, remodeling, and expansion; and
- supporting privately owned truck stops.

While this forum was held over 20 years ago, many of its recommendations are still relevant and useful considerations for department management. If the department deems the cost of constructing new facilities too high, another option to consider would be increasing the number of truck-only parking locations with no facilities so that fewer CMVs park on interstate entrance and exit ramps and roadway shoulders.

Management's Comment

We concur. Safe truck parking nationwide is an issue. However, Tennessee is a leader in truck parking efforts comparing various states through our research projects. While truck parking is a national issue based upon location and need at a given point in time; Tennessee is poised better than other states that offer extremely limited parking spots for commercial motor vehicles. Tennessee, through 3 different studies, has used data to show where the issue is, the future need based upon projected demand and currently looking at the top 20 opportunities to increase safe truck parking in Tennessee. There is no federal funding associated with creating specific truck parking facilities

although Tennessee has been aggressive and looking to expand spaces (e.g., MPDG Federal grant to increase truck parking in Smith County). Additionally, several travel operators (e.g., Pilot, Flying J, Travel America) operate in most areas of our state and provide safe truck parking at a cost to the trucks which saves the states money in maintenance cost, lighting, trash receptacle, etc. To this date, the State has absorbed some of these costs to date with no federal funding to address this issue.

Maintenance of Roads in State Parks

Tennessee State Parks were established to protect and preserve the unique natural, cultural, and historic resources of Tennessee. The Department of Transportation and the Department of Environment and Conservation are responsible for maintaining roads in state parks and natural areas so visitors can use and enjoy these areas.

Our goal was to determine if an agreement had been established between the two departments; however, we found the two departments disagree on who is responsible for maintaining the roads in natural areas that are outside state park boundaries. The Department of Transportation should seek guidance to resolve the question of responsibility for road maintenance in the state's natural areas when outside state park boundaries. See **Observation 5**.

General Background

According to the Tennessee State Parks website, there are 57 state parks created to protect and preserve the unique natural, cultural, and historic resources of Tennessee. Section 11-3-101, *Tennessee Code Annotated*, defines a park as

any and all areas of land heretofore or hereafter acquired by the state, which by reason of having natural and historic features, scenic beauty or location, possess natural or potential physical, aesthetic, scientific, creative, social or other recreational values, and are dedicated to and forever reserved and administered by the state for the recreational and cultural use and enjoyment of the people.

The state's natural areas are located both within state parks and in other areas of the state not associated with a state park. All state natural areas are codified in Section 11-14-108, *Tennessee Code Annotated*, to preserve the areas from any destruction and to maintain scenic beauty. There are 84 state natural areas, including Grundy Forest State Natural Area,⁵⁸ a 234-acre location in Grundy County that is open to the public for hiking and camping, as shown in Figure 23.

Natural areas are located both within and outside of state park boundaries.

Figure 23
Grundy Forest State Natural Area



Source: The Department of Environment and Conservation's website.

For almost 30 years, the two departments operated under a memorandum of understanding

In 1983, former Governor Lamar Alexander signed Executive Order No. 39, which stated,

The function of maintaining all roads and parking areas lying **within** [emphasis added] the boundaries of lands defined as parks in the Tennessee Code Annotated, Section 11-3-101, be transferred from the Department of [Environment and] Conservation to the Department of Transportation.

The executive order gave the responsibility of road maintenance within state parks to the Department of Transportation (the department) since it had the most experience maintaining roads. Based on this executive order, the two departments created a memorandum of understanding (MOU) to outline each party's responsibilities as follows:

⁵⁸ Grundy Forest State Natural Area is in the South Cumberland State Park.

The maintenance on the roads and parking areas shall consist of those matters necessary to maintain the roadway from ditch to ditch, all drainage structures, all bridges and abutments, all regulatory and warning signs which relate to traffic control and pavement markings. . . . Conservation will continue to be responsible for all mowing and litter management, and for maintenance of dams but Transportation will maintain the roads crossing any dams.

During our audit work for the department's 2019 performance audit, the department's former Director of Maintenance explained that the terms formalized in the MOU were meant to be included in state statute, but with the MOU in place, this never occurred. The parties operated under this agreement for over 30 years before each department's responsibilities were added to the statute.

The General Assembly passed a new law in 2017 to clarify each department's responsibilities

The parties began to disagree about which department was responsible for maintaining certain types of paths and trails, such as driveways and restricted access roads. In addition, the departments had not worked together to keep the inventory of parks updated after signing the MOU in 1983. To ensure expectations were fair and equitable, in 2017, Public Chapter No. 425 was passed to clarify each department's responsibilities. This act added Section 54-1-126(c), *Tennessee Code Annotated*, which states,

(c) The department of transportation is responsible for maintenance of public roads and bridges within the boundaries of parks, as defined by § 11-3-101, administered by the department of environment and conservation, as follows:

- (1) Maintenance work undertaken by the department of transportation shall be limited to the following items as necessary to maintain the roadway:
 - (A) Resurfacing and repair of the travel lanes and shoulders;
 - (B) Repair and cleaning of drainage structures;
 - (C) Repair of bridges and abutments;
 - (D) Repair of retaining walls and tunnels; and
 - (E) Replacement or repair of traffic control devices installed in accordance with the Manual on Uniform Traffic Control Devices, including regulatory and warning signs and pavement markings;
- (2) Maintenance of the public roadway rights-of-way, including mowing and litter removal, as well as maintenance of golf cart paths, greenways, trails, parking lots, driveways, restricted access service roads, and any similar facilities shall remain the responsibility of the department of environment and conservation. The department of transportation may perform any of this maintenance work on behalf of the department of environment and conservation in accordance with an interagency agreement; provided, that the agreement shall require the department of transportation to be reimbursed for the cost of performing the work;

- (3) In coordination with the department of environment and conservation, the department of transportation shall develop and maintain an inventory of public roads and bridges within each state park that are eligible for maintenance by the department of transportation under this subsection (c) and shall develop a program to prioritize maintenance needs. The department may enter into a written agreement with the department of environment and conservation related to such maintenance work.

This statute allows the department to complete other work in parks, such as repaving a private park road that provides access to a park ranger's house, with the Department of Environment and Conservation (TDEC) reimbursing the department for the work. Additionally, this statute makes the department responsible for conducting and maintaining an inventory of public roads and bridges within each state park that are eligible for maintenance by the department.

The department inventoried all public and private roads within the boundaries of state parks in 2016 using mapping software to clearly label which party was responsible for which segments of the roads and successfully worked with TDEC to determine the responsible party for any segments the two disagreed on. This inventory⁵⁹ identified 176 miles of public roads within the boundaries of state parks that the department is responsible for maintaining.

The two departments have not agreed on a revised MOU

Since 2017, the department and TDEC have been in negotiations to develop a new MOU. As part of our previous audit in 2019, department management provided us with a draft MOU and stated their intent to finalize the agreement before December 31, 2019.

During our current audit, department management explained that negotiations had continued since 2019, and they provided us with the latest draft MOU from 2020. We reviewed the MOU and found that it outlines details about maintenance work, such as annual meetings to prioritize maintenance projects and the cooperative process for when new roads are built within the boundaries of state parks or when new state parks are designated. Furthermore, we reviewed the evidence of the negotiations between the two departments, which showed that the department took the responsibility of maintaining natural area roads within the boundaries of state parks. We also noted that the 2020 MOU included a change to the definition of "state park":

"State park" means a park as defined in Tenn. Code Ann. § 11-3-101 and managed by TDEC as a state park under Title 11, Chapter 3, of the Tennessee Code. **For the purposes of this MOU, "state park" also includes any state natural areas** listed in Tenn. Code Ann. §11-14-108 that are **within the boundaries of a state park** administered by TDEC [emphasis added].

⁵⁹ As of June 2023, the department's inventory identified a total of 364 public and private road miles within the boundaries of state parks. The department is responsible for 176 road miles, while the remaining road miles fall under the responsibility of other state departments, cities, or counties.

The department's former Commissioner signed the draft MOU in October 2020; however, TDEC's Commissioner did not. Due to administration changes and other priorities, the parties stopped discussions and did not finalize an agreement.

While there is no new agreement, the department has continued to follow maintenance requirements in Section 54-1-126, *Tennessee Code Annotated*, and maintains all public roads, including ones for natural areas, within the boundaries of state parks. The department stated that Section 54-1-126(c)(1), *Tennessee Code Annotated*, explicitly defines the department's maintenance responsibilities as resurfacing and repair. The Assistant Chief Engineer of Operations explained that maintenance is only the upkeep of existing infrastructure to preserve it from failure or decline from a safe and useful condition. The department's maintenance activities do not include upgrading roads from gravel to pavement or adding new roads unless reimbursed by TDEC.

Based upon our discussion with the department's Assistant Chief Engineer of Operations, the department and TDEC have a good working relationship and generally resolve any disagreements about state park roads or boundary lines. The two parties have not finalized an MOU due to a fundamental disagreement about who should maintain roads in natural areas that are not within the boundaries of state parks. See **Observation 5** below.

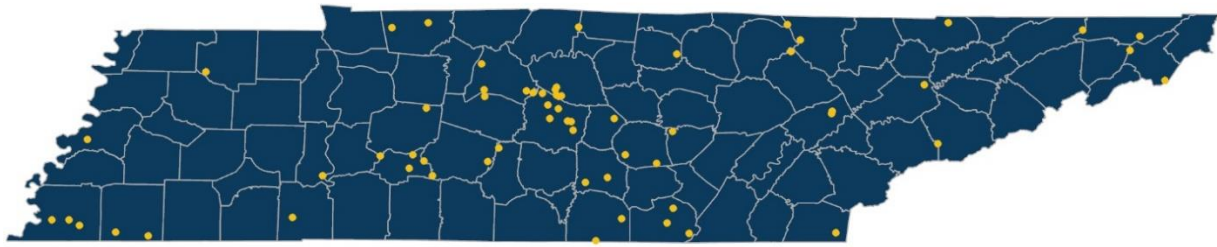
Observation 5

Department of Transportation and Department of Environment and Conservation managements disagree about which entity is responsible for maintaining roads in natural areas **outside** the boundaries of state parks

TDEC believes the department is responsible for maintaining roads in natural areas outside state parks, but the department disagrees

Due to continued disagreements between the Department of Transportation (the department) and the Department of Environment and Conservation (TDEC), the two parties have not signed a new memorandum of understanding (MOU) as of September 2023. Based on our discussions with department management and both departments' general counsels, the departments disagree on which lands are included in Section 54-1-126(c), *Tennessee Code Annotated*. This section references Section 11-3-101, *Tennessee Code Annotated*, the statute that defines state parks. According to TDEC's General Counsel, the reference to Section 11-3-101 means that the department is responsible for the roads in all the state's natural areas, **whether or not** they fall within the boundaries of state parks. See **Figure 24** for a map that shows natural areas outside the boundaries of state parks.

Figure 24
Natural Areas Outside the Boundaries of State Parks



Source: Created by auditor using GIS mapping information of state park boundaries and state natural area locations.

The department's General Counsel and maintenance management disagree with TDEC's interpretation of the statute. The department states that Section 54-1-126(c), *Tennessee Code Annotated*, specifies that they are only responsible for the roads and bridges that are **within** the boundaries of state parks. The department's former Chief Policy Advisor explained that the purpose of the reference to Title 11, Section 3, *Tennessee Code Annotated*, was to specify that their responsibilities were only for state parks. He further stated that had the department been authorized to or given the responsibility to maintain roads "outside" the park boundaries, such as within natural areas, then Section 54-1-126, *Tennessee Code Annotated*, would have referenced Title 11, Chapter 14, *Tennessee Code Annotated*, the statute that codifies natural areas.

Because the department believes that roads in natural areas outside a state park boundary are TDEC's responsibility, the department did not include these roads in its inventory. Neither the department nor TDEC could provide the road mileage in **natural areas that are outside the boundaries of state parks, which are the roads in contention**. Without such data, the state has not determined the potential maintenance costs for including all natural areas in the department's routine maintenance. The department already faces a backlog of projects that affect its ability to perform maintenance tasks, which we discuss further in the department's **Challenges for Tennessee's Infrastructure System** section; see **Observation 2**.

Maintaining roads in natural areas outside the boundaries of state parks ensures that the public can use and enjoy these areas

When discussing this agreement with department management, the Assistant Chief Engineer of Operations stated, "The MOU is the path to success." Without a governing legal opinion, this increases the risk that these natural area roads may not be maintained and could result in declining conditions or the inability to access the state's natural areas. Although written, formal procedures for operations are not required based on statute, a formal agreement would ensure that each party's responsibilities are clearly defined and based on agreed-upon terms.

Recommendation

The Commissioner of the Department of Transportation should seek a legal opinion from the Attorney General's Office regarding the interpretation of relevant sections of *Tennessee Code Annotated*. The Commissioner should then use this guidance to formalize a new MOU with the Department of Environment and Conservation. The MOU should detail maintenance responsibilities for all roads in state parks and natural areas, and both parties should sign the document. Depending upon the terms of the MOU, the Commissioner should consider having staff perform an inventory of all roads in natural areas that have not previously been inventoried in order to document the condition of the existing infrastructure (that is, a gravel path versus a paved road).

Management's Comment

We concur. TDOT and TDEC have not agreed on the responsibility for the maintenance of public roadways within natural areas not included in a State Park. TDOT will work to develop a revised Memorandum of Understanding that documents each area of responsibility. TDOT and TDEC are amenable to pursuing and interpretation from the Attorney General. Also, discussions have resumed in the last month in this area and a formal listing of the inventory in question is forthcoming from TDEC for TDOT to review. The next step after the review of the inventory is to collect detailed condition assessment as stated in the recommendation.

Risk Assessment

It is management's responsibility to provide a strong internal control system by identifying and evaluating what could go wrong and developing additional processes that mitigate those risks. This process is known as a risk assessment.

Our goal was to review the Department of Transportation's risk assessment to determine the internal control system was effective. We found that management did not assess risks or develop controls in several new areas and in areas that we have previously reported and again found in the current audit. Without committing to a comprehensive risk assessment process, management cannot ensure an effective internal control system is in place and operational. See **Finding 6**.

General Background

Each state agency must perform an annual risk assessment to identify risks to the organization and develop procedures to mitigate those risks

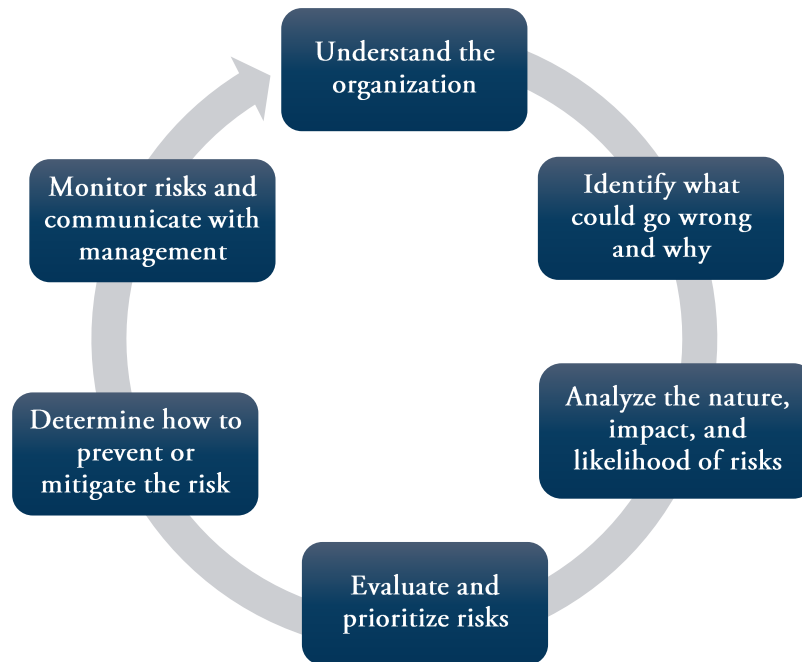
To help state agencies prepare their risk assessments in compliance with the Financial Integrity Act of 1983,⁶⁰ the Tennessee Department of Finance and Administration provides guidance and resources, including "Management's Guide for Enterprise Risk Management and Internal Control," and incorporates the U.S. Government Accountability Office's *Standards for Internal Control in the Federal Government* (Green Book).⁶¹ **Figure 25** provides a visual representation of the risk management process.

A risk assessment involves identifying and evaluating what could go wrong and developing additional processes to mitigate those risks.

⁶⁰ The Financial Integrity Act of 1983, located in Title 9, Chapter 18, *Tennessee Code Annotated*, requires each agency's management to annually perform a risk assessment and requires the head of each agency to issue an annual management report to the Department of Finance and Administration and the Comptroller of the Treasury.

⁶¹ The Green Book defines the standards for internal controls through components and principles and explains why they are integral to the governmental entity's operations.

Figure 25
Risk Assessment Process



Source: Auditor created based on the Department of Finance and Administration's "Management's Guide for Enterprise Risk Management and Internal Control."



Finding 6

Management's risk assessment process fell short in addressing the department's risks and developing controls to ensure it is fulfilling its mission and vision

Management did not fulfill their duty to conduct a comprehensive risk assessment

We focused our risk assessment review on risks identified related to our audit objectives. We found that management did not fully evaluate all program and operational areas within the department in their risk assessment process in calendar year 2022, the most recent available. This included areas where we previously reported audit findings. Although management did identify some risks and controls in the areas of construction and finance, they did not evaluate critical department operations for the following areas

1. the rest area system (see **Finding 4** and **Finding 5**),
2. information system planning (see **Finding 1**),

3. alternative construction delivery methods (see **Observation 1**),
4. railroad crossing inspections (see **Finding 3**),
5. Empowering People, Influencing Culture (EPIC), and
6. state park road maintenance (see **Observation 5**).

For the operational areas management did evaluate, such as the Rail Program,⁶² we found that management had not identified risks with enough specificity to develop a well-defined control, or the identified control was not specific enough for staff to know how to respond to the risk. For example, one of management's identified risks involved the reduction of revenues for the railroad program. Management had also identified the following controls to address lost revenue: management reviews, clarity of vision/purpose, adherence to professional standards, honest/open communication, and accountability. Without specific actionable controls, management did not provide enough guidance to assist staff in how to avoid or mitigate the risk of lost revenue.



Based on our discussions with management, leadership did not fully understand their responsibility to develop a comprehensive risk assessment, which is the first step to achieving an effective control system.

According to Green Book Principle OV1.03, “Definition of Internal Control,”

Internal control comprises the plans, methods, policies, and procedures used to fulfill the mission, strategic plan, goals, and objectives of the entity. Internal control serves as the first line of defense in safeguarding assets. In short, internal control helps managers achieve desired results through effective stewardship of public resources.

Without a comprehensive risk assessment process, management may not design and implement a robust internal control system to effectively achieve the department's mission.

Recommendation



The Commissioner and department leadership should reevaluate their risk assessment process. The risk assessment should identify risks within every program area and should include specific effective controls to mitigate the identified risks. Additionally, management should continue to address the critical risks we have noted in each new or repeated

⁶² We reviewed the risks in this section but did not identify risks related to our objective with rail crossing inspections.

finding or observation in this report, update the risk assessment as necessary, assign staff to be responsible for ongoing monitoring of the risks and mitigating controls, and take action if deficiencies occur.

Management's Comment

We concur. When the issues involving the risk assessment process were brought to management's attention, immediate actions were taken to correct weaknesses that were identified to ensure that the department performs a comprehensive, enterprise-wide risk assessment in 2023. Management reviewed the process utilized by the former Director of the Internal Audit Division to facilitate the department's risk assessment in 2022. To remediate the issues, the 2023 risk assessment is being conducted utilizing the risk management toolset provided by the Department of Finance and Administration in place of forms and questionnaires that were developed in-house. Also, the department initiated the risk assessment process two months earlier than it did in 2022 to provide management with the time necessary to perform a more extensive assessment of the department's risks and evaluate the controls in place to address the risks. During this expanded timeline, the Internal Audit Division is providing education to each TDOT division on assessing and responding to risks, with an increased focus on the functional areas involving critical risks that were noted in the report. Management also understands that risk management is a continuous process. Going forward, the Internal Audit Division will conduct meetings with management of each TDOT division on at least a quarterly basis to update the risk assessment and discuss any changes to objectives, identification of additional risks, and the effectiveness of the controls in place to address risks.

Appendices

Appendix 1 Objectives, Conclusions, and Methodologies

The Department of Transportation's Challenges for Tennessee's Infrastructure System

1. **Audit Objective:** Did department management follow Policy 355-01, "Approval of Construction Change Orders and Force Account Work," to ensure projects were completed on schedule and within budget?

Conclusion: Although we determined that management did follow Policy 355-01, we noted an opportunity for the department to use change orders more efficiently in the future. See [Observation 1](#).

2. **Audit Objective:** Did management implement new methods to improve the delivery and maintenance of transportation construction projects?⁶³

Conclusion: Based on our review and discussions with management, the department has begun implementing new procedures to improve the delivery and maintenance of transportation construction projects and is testing the new procedures on 19 pilot projects.

3. **Audit Objective:** Did management use a consistent methodology for calculating alternative-delivery cost savings?

Conclusion: Based on our review, we determined that management did not use a consistent methodology for calculating Design-Build and Construction Manager/General Contractor alternative delivery cost savings. Additionally, we noted an opportunity for the department to clarify potentially misleading information regarding the cost-saving benefit of using alternative delivery methods in [Observation 1](#).

4. **Audit Objective:** What is the department's status of implementing its choice lane initiative?

Conclusion: Based on discussion with management, the department is conducting feasibility assessments, revenue studies, and traffic studies, and plans to provide

⁶³ According to "Definitions," Title 40, *Code of Federal Regulations*, Part 278, transportation construction projects are defined as "activities [that] relate to the construction of roads and highways and include bases, sub bases, road surfaces, bridges, abutments, shoulders, and embankments. They are not related to any residential use."

Appendix 1 (Continued)

a report to the General Assembly with its findings on December 1, 2023. We noted that the department has several critical decisions ahead regarding choice lanes in [Emerging Issue 1](#).

5. **Audit Objective:** Has management taken actions to address staff turnover and vacancies within the department?

Conclusion: Management has taken actions to increase staff retention and fill vacancies within the department by implementing the Empowering People Influencing Culture (EPIC) initiative and raising some salaries to better align with market averages.

6. **Audit Objective:** In response to the prior audit observation, what is the status of project completion and budgetary needs for the IMPROVE Act projects?

Conclusion: As of July 3, 2023, the department has completed 23% of the IMPROVE Act projects and has begun preliminary engineering, right-of-way, or construction activities on another 46% of the projects. Management expects the remaining projects to take until 2073 and cost \$16 billion to complete. See [Observation 2](#).

7. **Audit Objective:** Did management use appropriate information/data-driven resources to make decisions about transportation challenges?

Conclusion: Based on our review, we determined that management has used industry-accepted and academically reviewed data to make informed decisions about their transportation challenges; however, we identified where management should evaluate their cost-estimating process to better plan for future changes in construction costs and delivery, as explained in [Observation 2](#).

Methodology to Address the Audit Objectives

To address audit objective 1, we interviewed the department's Director of Construction and Assistant Director of Construction Administration to obtain an understanding of internal controls significant to our audit objective and to assess management's design, implementation, and operating effectiveness of internal controls. We reviewed the department's Policy 355-01, "Approval of Construction Change Orders and Force Account Work," and Circular Letter 104.03-02 (Change Order Procedure).

We also conducted testwork analysis of executed change orders within our audit scope. For the change order testwork, we obtained a listing of all change orders executed between July 1, 2019, and June 14, 2023, a total of 1,995 testable items. We randomly sampled 60 items. We requested the change orders for those 60 items, which totaled \$5.06 million, and reviewed whether the department

Appendix 1 (Continued)

reviewed and approved the change orders in accordance with department Policy 355-01 and Circular Letter 104.03-02.

We also obtained a population of completed construction projects for the period July 1, 2019, through January 30, 2023, a total of 2,025 projects. From this listing, we determined each project's length and cost of construction and compared this to the original time and cost specifications to determine whether projects were at or below 8% of the original award amount. We analyzed the completed projects by project type to determine the average length of construction and average cost overruns for each project type.

To address audit objective 2, we interviewed the department's Chief Engineer, Chief Financial Officer, Alternative Delivery Director, Assistant Chief Engineer of Operations, Project Management Director, and Management from the Maintenance Division to determine the methods to improve the delivery and maintenance of transportation construction projects.

For the department's process for awarding a project to contractors, we performed walkthroughs of the department's prequalification process and bid authorization process. We obtained a population of completed construction projects for the period July 1, 2019, through January 30, 2023, a total of 2,025 projects. We randomly generated a sample of 30 transportation construction projects whose total cost was equal to or greater than 8% of the total awarded amount. We also generated a random sample of 30 transportation construction projects whose total cost was less than 8% over the total awarded amount. We requested the contractor evaluations for our 60-item sample, plus extras, and reviewed whether the department reviewed and maintained the evaluations in accordance with the department's Circular Letter 102.01-01 (Contractor Performance Evaluation).

Additionally, we reviewed the following sources, including the *Project Delivery Network* Manual, department Circular Letter 102.01-01 (Contractor Performance Evaluation), department Circular Letter 104.03-02 (Change Order Procedure), the department's *Standard Specifications for Road and Bridge Construction 2021*, and *Rules and Regulations of the Tennessee Department of Transportation 1680-05-04*.

To address audit objective 3, which includes determining whether management used a consistent methodology for calculating alternative delivery cost savings, we interviewed the department's Alternative Delivery Director. We also performed a walkthrough with management to review cost-saving calculations from using alternative delivery methods instead of traditional delivery. We obtained management's calculations for its reported cost savings and recalculated the reported amounts.

To address audit objective 4, which includes determining the status of management's implementation of its choice lane initiative, we reviewed the department's 2022 study *Tennessee Congestion Action Plans*; the Tennessee Advisory Commission on Intergovernmental Relations' 2023

Appendix 1 (Continued)

study *Building Tennessee's Tomorrow: Anticipating the State's Infrastructure Needs*; the Texas A&M Transportation Institute Urban Mobility Report; Texas Department of Transportation's NTETEXPRESS and LBJTEXPRESS *Key Operation Facts & Benefits*; the Federal Highway Administration's Center for Innovation: Project Delivery Profiles, Sections 54-1-119 and 54-1-501; and *Tennessee Code Annotated*, the Transportation Modernization Act, Public Chapter No. 159 (2023). We also interviewed the department's Chief Financial Officer and Chief Engineer.

To address audit objective 5, which includes determining if management has taken action to address staff turnover and vacancies within the department, we interviewed the department's Assistant Chief of Administration/Human Resources Director and Chief Financial Officer. We also conducted an analysis of employee salaries and analyzed vacancy and separation trends for Technicians, which was the job category with the most department employees.

To address audit objective 6, regarding a prior audit observation on the status of IMPROVE Act projects, we conducted interviews with the department's Assistant Chief Engineer, Transportation Manager 2, Chief Financial Officer, and Finance Director to obtain an understanding of internal controls significant to our audit objective and to assess management's design of internal controls for the current status of the IMPROVE Act projects and plans to complete the project listing, and the growth of user fee revenues. We reviewed the following studies and sources: Public Chapter No. 181 and 425, and Sections 55-4-112 through 55-4-116, 67-3-201, 67-3-202, 67-3-912, 67-3-1102, and 67-3-1113, *Tennessee Code Annotated*. We performed a project data analysis with information from the IMPROVE Act Status report for June 12, 2019, through June 30, 2023, Project Modification Report, and the Expanded June 30, 2023, IMPROVE Act Status report obtained from the Transportation Manager 2 and performed a user fee revenue analysis with data obtained from the state's enterprise resource management system and budget, which was verified by the Finance Director.

To address audit objective 7, which includes assessing if management used appropriate data/information to make assertions about transportation challenges, the sources the department used to create informational materials for the public posted on the department's Build With Us website. Additionally, we reviewed the following studies and sources: The Tennessee Comptroller's Office of Research and Education Accountability 2015 study *Tennessee Transportation Funding: Challenges and Options*; National Academies of Sciences, Engineering, and Medicine's 2019 study *Renewing the National Commitment to the Interstate Highway System: A Foundation for the Future*; the department's 2022 study *Tennessee Congestion Action Plans*; and Texas A&M's Transportation Institute Urban Mobility Report.

Information Systems and Operations

1. **Audit Objective:** Did department management ensure its information systems met its current and future infrastructure and security needs?

Appendix 1 (Continued)

Conclusion: While department management has maintained its current aging information systems to deliver basic operational functionality, management has not completed advanced planning for its future needs for new information systems to support its evolving business requirements. See **Finding 1**.

Additionally, management did not follow state information systems security policies regarding information systems controls. See **Finding 2**.

2. **Audit Objective:** In response to the prior audit finding, did the department management follow state information systems security policies regarding system controls?

Conclusion: Based on our review, the department conducted a Business Impact Analysis and prepared disaster recovery plans.

Methodology to Address the Audit Objectives

To address our audit objective 1, we interviewed key members of the department's Information Technology Division and observed operational processes to obtain an understanding of internal controls significant to our audit objective and to assess management's design of internal controls. Our inquiries to management included interviews with the department's Chief Information Officer, the Network Operations Security Manager, and the Business Solutions Architect. We also performed walkthroughs and observational testwork on system settings. During the meetings, we continued discussions about the overall operations involved in managing the department's critical systems.

We reviewed the department's draft Information Systems Plan for 2017 and 2019. To determine the department's statutory responsibilities for information systems planning, we examined Section 4-3-5502, *Tennessee Code Annotated*, and Information Systems Council Policy 7.00, "Information Systems Planning." We interviewed a senior STS IT Planning and Governance Manager and inspected relevant internal policies and procedures, including the *2023–2024 Information Systems Plan Guidelines*, to obtain an understanding of the processes in place to document information systems planning, to obtain an understanding of internal control significant to our audit objective, and to assess management's design and implementation of internal controls.

To assess the design of internal control for our audit objective, we identified controls from the National Institute of Standards and Technology (NIST) Special Publication 800-53⁶⁴ that, according to NIST, should be implemented in large organizations such as the Department of Transportation, and we interviewed department management to gain an understanding of how management deployed these controls at the department. We observed information security settings on key systems, and we

⁶⁴ The NIST Special Publication 800-53, *Security and Privacy Controls for Information Systems and Organizations*, is a set of recommended security and privacy controls for federal information systems and organizations to help meet the Federal Information Security Management Act requirements.

inspected evidence demonstrating how the department configured information security for compliance with the state's *Enterprise Information Security Policy*.

To address our audit objective 2, we interviewed key members of the Department of Transportation's Information Technology Division, reviewed relevant policies and procedures, and observed operational processes to gain an understanding of the department's information security policies and the creation of its Business Impact Analysis and disaster recovery plans as well as to obtain an understanding of internal controls significant to this objective and to assess management's design of internal control. Our inquiries to management included interviews with the department's Chief Information Officer, Network Operations Security Manager, Business Solutions Architect, and IT Business Analyst-Senior. We also interviewed the STS Vulnerability Management Program Supervisor. We performed walkthroughs to gain an understanding of this objective. We reviewed the overall operations involved in managing the department's Business Impact Analysis and Disaster Recovery Plan.

Rail Safety Inspection Program

1. Audit Objective: In response to the prior audit finding, did Office of Rail Safety and Inspection management update their overall inspection and complaint process, including updated written policies and procedures, to effectively address rail crossing repairs?

Conclusion: We learned that management chose not to update the office's written manual and instead operate with verbal policies and procedures. Management did not update the inspection and complaint process as recommended and we found the process was not sufficient to provide management enough information to operate the program. Additionally, management did not consider a change to policy to require railroad companies to inform the department of repairs. See **Finding 3**.

2. Audit Objective: Did management establish the necessary internal controls for maintaining accurate and complete data in RRSIS for managing the Rail Safety Inspection Program?

Conclusion: Management did not establish compensating controls for the known risk that the system did not maintain inspection data beyond three years. Additionally, management did not design internal controls to ensure the completeness and accuracy of the inspection data. See **Finding 3**.

3. Audit Objective: Did the department's Office of Rail Safety and Inspection management consider nationwide trends that could be used to make the State Safety Participation Program more effective?

Appendix 1 (Continued)

Conclusion: Based on our review of nationwide information, we found that the Office of Rail Safety and Inspection should evaluate the State Safety Participation program, including establishing an annual crossing closure plan to identify unrepaired, dangerous, or blocked crossings. See [Observation 3](#).

4. Audit Objective: What is the department’s plan to address railroad crossings blocked by trains for extended periods of time?

Conclusion: Based on our review, we found that management has identified blocked crossings and reports on the number of blocked crossings annually to the General Assembly. To address this issue, the department identifies opportunities to close or alter blocked crossings using the Federal Railroad Crossing Elimination Grant Program. See [Emerging Issue 2](#).

Methodology to Address the Audit Objectives

To address our audit objective 1, including gaining an understanding of the rail inspection and complaint process and assessing management’s design of internal controls significant to our audit objective, we interviewed the Rail Inspection Manager, Freight and Logistics Director, and the Rail Engineering Manager. We reviewed the following items:

- 49 *Code of Federal Regulations*, Part 212; and
- RDA Number 442, “Daily Railroad Inspector’s Report.”

We also reviewed the following parts of *Tennessee Code Annotated*:

- Sections 65-11-101 through 65-11-103, regarding construction and repair of highway crossings and the related penalties for noncompliance;
- Section 65-3-123, regarding abatement of dangerous or unhealthy conditions for railroads and highway crossings; and
- Sections 65-3-201 and 65-3-202, regarding the assessment and collection of the ton-mile fee.

To address our audit objective 2, including gaining an understanding of the reliability of data within the RRSIS information system, and assessing management’s design of internal controls significant to our audit objective, we interviewed the Rail Inspection Manager, Freight and Logistics Director, and the Information Technology Division Director.

To address our audit objective 3, to determine nationwide trends involving public at-grade highway-rail crossing inspections, we reviewed the 2019 Statewide Rail Plan and the 2023 Statewide

Multimodal Freight plan, other state audit reports related to the State Safety Participation Program, as well as news articles from nationwide sources and national research from the U.S. Department of Transportation.

To address our audit objective 4, to determine the number of blocked crossings in the state we reviewed the 2022-2023 Blocked Crossings Report, Public Chapter No. 178, that addresses the creation of the annual report, as well as news articles from nationwide sources.



Data Reliability Review

The U.S. Government Accountability Office, whose standards we are statutorily obligated to follow, requires us to assess the sufficiency and appropriateness of computer-processed information we use to support our findings, conclusions, and recommendations. To evaluate this data, we reviewed existing information about the data and interviewed management and staff knowledgeable about the data. We found that RRSIS data for determining the number of poor crossings, the number of reinspections, and how long poor crossings were unrepaired was *not sufficiently reliable* for our planned audit objectives.

Rest Area System

1. **Audit Objective:** Did department management ensure that the rest area system was operational and addressed the needs of the public?

Conclusion: Based on our review of inspections performed, we found that management's monitoring and inspection process did not ensure inspections were conducted uniformly or that maintenance needs were addressed at the facilities to meet the basic needs of the public. See **Finding 4**.

Top leadership at the department may wish to consider evaluating the long-term future of Tennessee's rest area system. See **Observation 4**.

2. **Audit Objective:** Did department management establish the necessary controls for reimbursing Tourist Development for the cost of operating the state's welcome centers?

Conclusion: Based on our review, management reimbursed questionable expenditures to Tourist Development outside of any established agreement. Management did not design internal controls to ensure all costs were appropriate and spent in

Appendix 1 (Continued)

accordance with the intent of the funds. See **Finding 5** and the **Matter for Consideration**.

3. **Audit Objective:** What is the department's plan to increase commercial motor vehicle parking in Tennessee?

Conclusion: Based on our review, management has identified the shortage of safe commercial motor vehicle parking locations in the state as an issue impacting highways and roads. To help address this, the department has worked with universities in the state to study areas that have commercial motor vehicle parking shortages and causes. See **Emerging Issue 3**.

Methodology to Address the Audit Objectives

To address our audit objective 1, which included gaining an understanding of the rest area system operations and assessing management's design of internal controls significant to our audit objective, we interviewed the Assistant Chief Operations, the Transportation Manager 2, and the Facilities Manager 3. We reviewed Title 23, *Code of Federal Regulations*, Part 752; Sections 4-3-2204 and 4-3-2209, *Tennessee Code Annotated*; and Executive Order No. 44 to determine who is responsible for the rest area system. We reviewed rest area contract recertifications with CMRA for fiscal years 2020 through 2024 to determine the pricing structure and the contractor's responsibilities. We visited all 35 facilities during the period February 22, 2023, through April 29, 2023, in the rest area system in Tennessee to determine the facility conditions and general operations. We reviewed the most recent inspections completed from January 10, 2023, to June 22, 2023, by CMRA and Tourist Development and completed by the department's Facilities Manager for all 16 welcome center and 19 rest area facilities to determine whether inspections were conducted and if maintenance issues were identified.

To address our audit objective 2, which included gaining an understanding of the department's process for reviewing and approving reimbursement requests from Tourist Development and assessing management's design of internal controls significant to our audit objective, we interviewed the department's Transportation Manager 2, the Facilities Manager 3, and the Director of Finance. To determine Tourist Development's operation of welcome centers, we interviewed Tourist Development's Assistant Commissioner of Welcome Centers and the Assistant Commissioner of Administration. We reviewed Section 4-3-2209, *Tennessee Code Annotated*, and Executive Order No. 44 to determine each agency's responsibilities for the operations of welcome centers. We reviewed the department's maintenance budget for fiscal year 2023 and reviewed the statewide budget for fiscal years 2019 – 2020 through 2023 – 2024. We obtained all monthly invoices submitted to the department for welcome center operational expenditures, which totaled \$36,444,017 for the period July 1, 2019, through June 30, 2023, to determine the types of expenditures included and any potentially unreasonable accounts. From this review, we expanded our work and haphazardly selected transactions to review the supporting documentation that was maintained in Edison.

Appendix 1 (Continued)

To address our audit objective 3, we reviewed news articles from nationwide sources, nationwide research from the U.S. Department of Transportation, the Bureau of Transportation Statistics, and the American Trucking Research Institute to determine nationwide trends involving the rest area system facilities and interstate facilities. We reviewed *Truck Parking Needs in Tennessee*, a research study by the University of Memphis to determine statewide truck parking needs.

Maintenance of Roads in State Parks

Audit Objective: Did the department determine who is responsible for maintaining public roads in natural areas outside the boundaries of state parks?

Conclusion: As of September 2023, the Department of Transportation and the Department of Environment and Conservation have differing opinions on Section 11-3-101, *Tennessee Code Annotated*, and have not executed a new memorandum of understanding agreement to delineate responsibilities for maintaining state park roads and natural area roads. See [Observation 5](#).

Methodology to Address the Audit Objective

To address our audit objective, we reviewed Executive Order No. 39; the 1983 memorandum of understanding (MOU); the 2019 draft MOU; the 2020 draft MOU; and Sections 54-1-126, 11-3-101, 11-14-102, and 11-14-108, *Tennessee Code Annotated*. In addition, we interviewed the Department of Transportation's General Counsel, the former Chief Policy Advisor, and the Assistant Chief Engineer, as well as the Department of Environment and Conservation's General Counsel and the Comptroller's Office's General Counsel. To determine the number of miles of roads the department is responsible for within the boundaries of state parks, we obtained lists delineating responsibilities for each park for all relevant parties.

Risk Assessment

Audit Objective: In management's formal risk assessment, did they identify fiscal, operational, reporting, and compliance risks and list control activities to prevent or minimize the identified risks?

Conclusion: Management prepared a risk assessment; however, they did not evaluate seven operational areas, including risks related to our audit objectives and risks identified in prior audit findings; and did not design specific internal controls for the identified risks. See [Finding 6](#).

Methodology to Address the Audit Objective

To address our audit objective, which included gaining an understanding of management's risk assessment process and assessing management's design of internal controls significant to our audit objective, we interviewed the Deputy Commissioner, the Chief Financial Officer in the Bureau of Administration, and the Internal Audit Director. We reviewed state statute to determine the requirements of the Financial Integrity Act. We reviewed the Department of Finance and Administration's "Management's Guide for Enterprise Risk Management and Internal Control" and the Green Book's requirements for risk assessments. To determine if management identified risks for prior audit findings and the current audit objectives, we obtained and reviewed the department's 2022 risk assessment documents. We also obtained and reviewed the department's "Enterprise Risk Management Guide," which was relevant to the risk assessment.

Resolved Prior Audit Finding

Audit Objective: In response to the prior audit finding, did Long Range Planning Division, Local Programs Development Office, and Highway Beautification Office management ensure risk assessments were prepared on subrecipients as required by the state's Central Procurement Office Policy 2013-007?

Conclusion: Based on our review, the Long Range Planning Division, Local Programs Development Office, and Highway Beautification Office each prepared risk assessments for subrecipients.

Methodology to Address the Audit Objective

To address our audit objective, including gaining an understanding of the Long Range Planning Division, Local Programs Development Office, and Highway Beautification Office's subrecipient risk assessment process and assessing management's design, implementation, and operating effectiveness of internal controls significant to our audit objective, we interviewed the Transportation Program Supervisor of the Long Range Planning Division, the Transportation Manager 1, and the Transportation Manager 2 of the Local Programs Development Office, and the Transportation Program Supervisor and the Transportation Manager 1 of the Highway Beautification Office. We also reviewed documentation including the prior audit finding, Central Procurement Office Policy 2013-007 "Grant Management and Subrecipient Monitoring Policy and Procedures," Title 2, *Code of Federal Regulations*, Part 200, Section 332, the Highway Beautification Office Outreach Handbook, and State and Federal Standard Long Range Planning Procedures. To determine that the Long Range Planning Division, Local Programs Development Office, and Highway Beautification Office complied with Central Procurement Office Policy 2013-007, we reviewed the annual monitoring plans from fiscal year 2019 through fiscal year 2023 and risk assessments.

Appendix 2

Internal Control Significant to the Audit Objectives

The U.S. Government Accountability Office's *Standards for Internal Control in the Federal Government* (Green Book) sets internal control standards for federal entities and serves as best practice for non-federal government entities, including state and local government agencies. As stated in the Green Book overview,⁶⁵

Internal control is a process used by management to help an entity achieve its objectives . . . Internal control helps an entity run its operations effectively and efficiently; report reliable information about its operations; and comply with applicable laws and regulations.

The Green Book's standards are organized into five components of internal control: control environment, risk assessment, control activities, information and communication, and monitoring. In an effective system of internal control, these five components work together to help an entity achieve its objectives. Each of the five components of internal control contains principles, which are the requirements an entity should follow to establish an effective system of internal control. We illustrate the five components and their underlying principles below:

Control Environment		Control Activities	
Principle 1	Demonstrate Commitment to Integrity and Ethical Values	Principle 10	Design Control Activities
Principle 2	Exercise Oversight Responsibility	Principle 11	Design Activities for the Information System
Principle 3	Establish Structure, Responsibility, and Authority	Principle 12	Implement Control Activities
Principle 4	Demonstrate Commitment to Competence	Information and Communication	
Principle 5	Enforce Accountability	Principle 13	Use Quality Information
Risk Assessment		Principle 14	Communicate Internally
Principle 6	Define Objectives and Risk Tolerances	Principle 15	Communicate Externally
Principle 7	Identify, Analyze, and Respond to Risks	Monitoring	
Principle 8	Assess Fraud Risk	Principle 16	Perform Monitoring Activities
Principle 9	Identify, Analyze, and Respond to Change	Principle 17	Evaluate Issues and Remediate Deficiencies

In compliance with generally accepted government auditing standards, we must determine whether internal control is significant to our audit objectives. We base our determination of significance on whether an entity's internal control impacts our audit conclusion. In the following matrix, we list our audit objectives, indicate whether internal control was significant to our audit objectives, and identify which internal control components and underlying principles were significant to those objectives.

⁶⁵ For further information on the Green Book, please refer to <https://www.gao.gov/greenbook/overview>.

Appendix 2 (Continued)

		Internal Control Components and Underlying Principles Significant to the Audit Objectives																
Audit Objectives	Significance	Control Environment					Risk Assessment				Control Activities			Information & Communication			Monitoring	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Did department management follow Policy 355-01, "Approval of Construction Change Orders and Force Account Work," to ensure projects were completed on schedule and within budget?	Yes	–	–	Yes	–	Yes	–	–	–	–	Yes	Yes	Yes	–	Yes	Yes	–	–
2 Did management implement new methods to improve the delivery and maintenance of transportation construction projects?	No	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3 Did management use a consistent methodology for calculating alternative-delivery cost savings?	No	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4 What is the department's status of implementing its choice lane initiative?	No	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5 Has management taken actions to address staff turnover and vacancies within the department?	No	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6 In response to the prior audit observation, what is the status of project completion and budgetary needs for the IMPROVE Act projects?	Yes	–	Yes	Yes	–	–	Yes	Yes	–	–	Yes	–	Yes	Yes	Yes	Yes	–	–
7 Did management use appropriate information/data-driven resources to make decisions about transportation challenges?	No	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8 Did department management ensure its information systems met its current and future infrastructure and security needs?	Yes	–	–	–	–	–	–	–	–	–	–	Yes	Yes	Yes	–	–	–	–
9 In response to the prior audit finding, did the department management follow state information systems security policies regarding system controls?	Yes	–	–	–	–	–	–	–	–	–	–	Yes	Yes	Yes	–	–	–	–
10 In response to the prior audit finding, did Office of Rail Safety and Inspection management update their overall inspection and complaint process, including updated written policies and procedures, to effectively address rail crossing repairs?	Yes	–	–	–	–	Yes	–	–	–	–	Yes	Yes	Yes	Yes	–	–	Yes	Yes

Appendix 2 (Continued)

		Internal Control Components and Underlying Principles Significant to the Audit Objectives																
Audit Objectives	Significance	Control Environment					Risk Assessment				Control Activities			Information & Communication			Monitoring	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
11 Did management establish the necessary internal controls for maintaining accurate and complete data in RRSIS for managing the Rail Safety Inspection Program?	Yes	–	–	–	–	–	–	–	–	–	Yes	Yes	Yes	–	–	–	–	–
12 Did the department's Office of Rail Safety and Inspection management consider nationwide trends that could be used to make the State Safety Participation Program more effective?	No	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
13 Did department management ensure that the rest area system was operational and addressed the needs of the public?	Yes	–	Yes	–	–	–	Yes	Yes	–	–	Yes	–	–	–	–	–	Yes	–
14 What is the department's plan to address railroad crossings blocked by trains for extended periods of time?	No	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
15 Did department management establish the necessary controls for reimbursing Tourist Development for the cost of operating the state's welcome centers?	Yes	–	Yes	–	–	–	Yes	Yes	–	–	Yes	–	–	–	–	–	Yes	–
16 What is the department's plan to increase commercial motor vehicle parking in Tennessee?	No	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
17 Did the department determine who is responsible for maintaining public roads in natural areas outside the boundaries of state parks?	No	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
18 In management's formal risk assessment, did they identify fiscal, operational, reporting, and compliance risks and list control activities to prevent or minimize the identified risks?	Yes	Yes	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
19 In response to the prior audit finding, did Long Range Planning Division, Local Programs Development Office, and Highway Beautification Office management ensure risk assessments were prepared on subrecipients as required by the state's Central Procurement Office Policy 2013-007?	Yes	–	Yes	–	–	–	Yes	Yes	Yes	Yes	–	–	–	–	–	–	Yes	–

Appendix 3

Department of Transportation Operations

The Department of Transportation consists of the Commissioner's Office and three Bureaus which help the department accomplish its mission and vision.

Commissioner's Office

The department currently has its 32nd Commissioner, who is appointed by the Governor. The Commissioner works as an advisor to the Governor, manages the Department of Transportation, and coordinates infrastructure investments throughout the state of Tennessee. The Commissioner's office also consists of the Chief of Staff and Legal Division.

The Chief of Staff is responsible for executing multiple-department efforts to implement the Commissioner's vision for Tennessee infrastructure investments. This position also guides the department's organizational operations and improvements necessary to fulfill the department's mission.

The Legal Division is responsible for providing the Commissioner, his staff, and all divisions and regions with a wide range of legal services, such as preparing and reviewing contracts, grants, procurement documents, departmental policies, and right-of-way acquisition documents; representing the department in administrative hearings; and coordinating responses to public records requests.

Bureau of Administration

The current leader of the Bureau of Administration is the Deputy Commissioner and Chief Financial Officer. The Bureau of Administration oversees administrative activities for the department. The divisions within this bureau include Federal and State Affairs, Community Relations and External Communications, Legislative, Human Resources, Central Services, Civil Rights, Finance, Information Technology, Internal Audit, Procurement, Strategic Planning, and Aeronautics.

The Federal and State Affairs Assistant Bureau Chief handles the department's transportation initiatives and federal-aid program issues. The Chief coordinates with internal stakeholders, key congressional offices, and Washington D.C.-based non-governmental organizations to develop federal policy positions promoting departmental goals and initiatives. The Federal and State Affairs Assistant Bureau Chief covers congressional hearings, tracks major transportation-related federal legislation, prepares materials for legislative visits, and provides timely and accurate responses to congressional inquiries. This division also works across all the department's bureaus to coordinate the department's comments to the Federal Register and develop action plans to implement major federal transportation legislation and policies.

Appendix 3 (Continued)

The Community Relations and External Communications Division strives to provide leadership in promoting the department; integrating the concerns of customers into processes; and promoting a consistent message by establishing relationships with the news media and community groups. The division also manages public meetings and hearings, manages the department's social media presence, and assists the public in accessing the department's services.

The Legislative Division advises the Commissioner and staff on legislative issues. Division staff work with members of the General Assembly to promote the department's agenda through legislation by developing and improving working relationships with members of the General Assembly; helping with responses and information to the legislators; analyzing and communicating the effect of proposed legislation; and preparing and implementing the department's initiatives.

The Legislative Assistant Director/ Policy Advisor provides policy guidance to the Commissioner and department staff on various aspects of the transportation program, coordinates the development of legislative strategy, and participates in national-level transportation policy development.

The Human Resources Division is responsible for supporting department employees across all 95 counties in the State of Tennessee with a focus on strategic planning, talent development, and management of employee experiences to cultivate a high-performing, agile workplace. This division has many services, which include learning and development, classification and compensation, recruitment, employee relations, and benefit counseling. The Human Resources Director provides appropriate guidance to executive leaders and managers to ensure compliance with all local, state, and federal employment laws, rules, and policies and serves as liaison with the Department of Human Resources related to transactions, classification compensation, payroll, benefits, and employee relations issues.

The Central Services Division is responsible for providing coordination and general administration of staff services, specifications, forms, contracts, and official documents. Central Services administers procurement procedures, supply chain, purchasing, inventory control, and fleet utilization, and facilitates the insurance and risk management programs. The division handles records management and acts as the agency publications liaison, issues special permits for overweight/over-dimensional loads, and oversees purchases of "alternative fuel vehicles." The division coordinates the annual budget for heavy equipment and vehicle purchases and operates the HQ motor pool. The division is responsible for assisting with facilities and property management, surplus property removal, and printing and distributing bid letters for the department.

The Civil Rights Division is responsible for the administration of state and federal programs of nondiscrimination, which includes Title VI, Affirmative Action, and Small Business Development. Each of these programs monitors all activities for compliance and provides training as well as on-site technical assistance. The division is also responsible for developing and implementing internal and

Appendix 3 (Continued)

external affirmative action plans for the department and investigating complaints of alleged sexual harassment and discrimination related to race, sex, color, and other protected groups. This division also administers the federally mandated Disadvantaged Business Enterprise Program.

The Finance Division is responsible for budget, payroll, project accounting, consultant auditing, contract setup and purchase order approvals, and Edison support. The centralized accounting office (part of the Department of Finance and Administration but assigned specifically to the department) is responsible for contracts and accounts payable, travel expense claims, asset accounting, accounts receivable and billing, and the general ledger.

The Information Technology (IT) Division directs, plans, coordinates, and manages the department's computerized information resources. IT staff evaluate, purchase, and install computer hardware and software, manage the department's LAN/WAN,⁶⁶ support mainframe computer applications, and provide technical assistance to department personnel in the use of the resources. The IT division is also responsible for computer application system development and maintenance for the department.

The Internal Audit Division is responsible for providing audit and assurance, consulting and advisory, education, and integrity services for the department. The primary focus of Internal Audit is conducting performance audits, which are designed to ascertain the efficiency, effectiveness, and economy of the department's various operational and financial programs, processes, and activities. Audit and assurance services are prioritized as a risk management approach to focus resources on areas of higher risks. The objective of this division is ultimately to provide management structure and senior leadership with the information necessary to make better decisions through practical and cost-beneficial recommendations geared toward improving operations. Consulting and advisory services help to initiate collaborative approaches to address concerns regarding the ever-changing business environment. Education services include training on ethical behavior, fraud awareness, internal controls, and proper use of assets by the department's employees. Lastly, integrity services are performed to substantiate alleged instances of fraud, waste, or abuse of department funds, either by employees, contractors, vendors, or grantees.

The Procurement Division is responsible for providing leadership and oversight for all procurement, purchasing, and contracting within the Central Procurement Office's (CPO) authority. This division serves as the liaison between the department and the state's CPO to maximize efficiency, accountability, and stewardship of taxpayer dollars. The focus of this division lies in areas that include ensuring department employees are properly trained on procurement rules, policies, and procedures; validating standard operating procedures through quality assurance; and advocating best practices for procurement. The division also manages the contract life cycle for the department through dedicated contract management.

⁶⁶ LAN: Local-Area Network, WAN: Wide-Area Network

Appendix 3 (Continued)

The Strategic Planning Division is responsible for assisting the department in defining a clear direction for the organization, coordinating with all divisions to develop and implement a strategic plan, and monitoring performance toward departmental goals. Critical transportation issues, trends, resources, customer needs, and results are monitored to evaluate the impact on departmental priorities. The office is also responsible for monitoring the implementation and progress of the strategic plan and ensuring alignment with other departmental goals and objectives. Performance results are reported in compliance with state and federal guidelines.

The Aeronautics Division helps to support, promote, and deliver services that encourage and enhance sustainable, efficient, and safe air transportation across Tennessee. The division is responsible for licensing public airports, monitoring compliance with federal grants, and providing flight services for branches of the state government. The division also provides technical and financial assistance to publicly owned airport operators for planning, promotion, development, construction, and operation of public-use airports across Tennessee. Planning and engineering services include environmental planning and compliance, aviation planning studies, project design consultation services, and Airport Geographic Information System (AGIS) studies.

Bureau of Engineering

The Bureau of Engineering is led by the Deputy Commissioner and Chief Engineer. This Bureau develops, preserves, and maintains the state highway system and helps local governments to develop their highway systems. Three assistant chiefs also help with the responsibilities of the Bureau. Duties within the Bureau of Engineering include designing, acquiring rights-of-way for, constructing, and maintaining projects; creating estimates; traffic control engineering and materials; and geological testing. The divisions within this bureau are Alternative Delivery, Asset Management, Project Management, Program Development and Administration, Professional Services, Engineering, Right-of-Way, Construction, Materials and Tests, Traffic Design, Utilities, Health and Safety, Maintenance Operations, Traffic Operations, and the Regional offices.

The Alternative Delivery Division is responsible for implementing the use of the different delivery methods (Design-Build and Construction Manager/General Contractor [CM/GC]) from procurement through construction across Tennessee, enacting and refining the Alternative Delivery Program (ADP); developing department policy, procedures, and manuals that maximize functionality and provide systematic measures to assess project selection for the health of the program; and researching, developing, and implementing new alternative delivery methods.

Asset Management Division responsibilities are currently under development as the department continues to move to a matrix organizational structure.

The Project Management Division is responsible for managing many statewide programs and projects from concept to delivery. Project Management is the single point of accountability for

Appendix 3 (Continued)

delivering projects within a defined scope, budget, and schedule, and ensuring equality. Other responsibilities of the division are ownership and maintenance of the Project Delivery Network (PDN) and development of project management tools, including project schedule templates, risk management tools, standardized project scopes, and project budget software.

The Program Development and Administration Division is responsible for developing and implementing the department's highway programs. The division compiles and administers the State Transportation Improvement Program (STIP). STIP contains a list of current and future highway improvement project phases across Tennessee. The division is also responsible for generating and processing state and federal project allotments, funding authorizations, and lastly administering state and federal funds through the Federal Highway Administration, which is used by local agencies for highway enhancement and safety improvements.

The Professional Services Division is responsible for the administration, prequalification process, advertisement, and competitive selection of professional services consultants based on qualifications. The services designated as professional services include engineering; alternative contracting; surveying and mapping; architecture; landscape architecture; planning; right-of-way acquisition and management; and construction engineering and inspection (CE&I). The Division procures services under the authority and guidance of federal and state laws, regulations, and rules.

Engineering Division responsibilities are currently under development as the department continues to move to a matrix organizational structure.

The Right-of-Way Division (ROW) is responsible for acquiring and managing all right-of-way needed for the maintenance and construction of highways in Tennessee. ROW also provides relocation assistance for displaced families and businesses in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 when necessary for state highway construction. Another responsibility of ROW is coordinating utility relocation and disposition of state-owned surplus real property. This division is divided into five different offices: the Appraisal Office, the Acquisition Office, the Relocation Office, the Excess Land Office, and the Consultants for Appraisal/Acquisition/Relocation/Utility Office.

The Construction Division is responsible for transitioning projects from the development phase into construction through contract completion. The division accomplishes this through three distinct groups: Contract Administration, Alternative Delivery, and Pre-Construction and Estimation.

The Materials and Tests Division is responsible for ensuring that all materials used in the construction and maintenance of state highways meet appropriate ASTM, AASHTO, and department specifications. They are also responsible for monitoring the quality and performance of the department's highway network by performing field evaluations, conducting production facility reviews, performing laboratory tests, and analyzing a variety of data. The Material and Tests Division

Appendix 3 (Continued)

coordinates pavement and materials research projects and maintains the department's Qualified Products List. Materials and Tests provides technical expertise and support to the department, including the development of new specifications, technician training and certification, and geotechnical testing and consulting.

The Traffic Design Division is responsible for the uniform application of traffic engineering principles and practices to improve traffic safety and mobility in Tennessee. This division provides expertise in the areas of traffic modeling, signing, pavement markings, signalization, highway lighting, Intelligent Transportation Systems (ITS) and System Engineering Analysis, managed lane systems, and emerging traffic technologies. This division is responsible for the development of work zone traffic control standards, policies, and procedures to be applied statewide by designers, maintenance crews, contractors, municipalities, utilities, and private consultants. The Traffic Design Division is also responsible for the audit, assessment, design, and implementation of the Highway Safety Improvement Program. The Traffic Design Division provides traffic engineering legal support for the department as part of the State Traffic Engineer role.

The Utilities Division is responsible for coordinating and relocating utilities and railroad facilities necessary for the accommodation of highway construction and improvement projects undertaken by the department. The Utilities Division also regulates, and issues permits for, installing utility facilities within state highway rights of way.

The Health and Safety Division is responsible for developing and implementing policies, specifications, and procedures to ensure the health and safety of people constructing, inspecting, maintaining, and traveling the state's transportation system. Occupational Health and Safety requires individual accountability, expects its employees to adhere to safety standards, and actively participates in and supports the advancement of health and safety practices. Safety is the responsibility of all employees including top management and individual employees.

The Maintenance Operations Division is responsible for developing and maintaining direct lines of communication to all parts of field operations. This division creates, facilitates, and ensures consistent application of the policies and procedures for all maintenance activities through guidance, training, and mentorship. In cooperation with the Asset Management Division and the Project Management Division, this office sets the strategic direction for all routine and emergency maintenance operations across the state.

The Traffic Operations Division is responsible for many operations, including the Traffic Management Center (TMC) and Traffic Incident Management (TIM) programs. The division also conducts transportation system performance monitoring and reporting and establishes TMC, TIM, and engineering guidelines procedures. Traffic Operations reviews national best practices for Transportation System Management and Operations (TSM&O); manages the department's wireless Radio Network; researches, manages, and deploys ITS projects; and oversees ITS Architectures and

Appendix 3 (Continued)

System Engineering Analysis. The division also supports the communication, coordination, and collaboration between HQ and regional offices; provides traffic engineering studies; and prepares traffic signals, roadway lighting, and roadway signage designs. The division also manages the state Logo and Tourist Oriented Direction Signs (TODS) programs and manages and supports Motorist Information Systems (Tennessee SmartWay, 511, Twitter).

Regional Offices are in Nashville, Knoxville, Chattanooga, and Jackson. Each regional office is led by a Director/Assistant Chief Engineer who oversees major operational responsibilities including construction implementation and compliance, highway maintenance and repair, highway marking, bridge inspection and repair, the state aid roads program, highway beautification, materials and tests, environmental conformity, highway safety, and office administration, including personnel matters. Region 1, located in Knoxville, includes 24 counties in the East Tennessee area. Region 2, located in Chattanooga, includes 24 counties in the surrounding area. Region 3, located in Nashville, includes 26 counties in the Middle Tennessee area. Region 4, located in Jackson, includes 21 counties in the West Tennessee area.

Bureau of Environment and Planning

The Bureau of Environment and Planning is led by a Deputy Commissioner who administers the environment and planning of the department and multimodal activities. The functions within the Bureau of Environmental Planning include environmental planning and technical studies, environmental compliance, long-range planning, metropolitan and rural planning, freight planning, corridor and subarea planning, rail rehabilitation and oversight, public transportation program management and technical assistance, bicycling and pedestrian planning and infrastructure, research, GIS and data analytics, traffic data collection and analysis, and highway beautification. The divisions within the bureau include Freight and Logistics, Environmental, Long Range Planning, Multimodal Transportation Resources, Strategic Transportation Investments, and Local Programs.

The Freight and Logistics Division provides leadership on issues of water, rail, and highway freight. The division serves as the liaison between the department and freight stakeholders to find opportunities to improve access for existing freight and appropriately prepare for the projected increases in freight as it moves in and out of state. The division focuses on areas that include water, short-line railroads, rail inspections, highway freight and technology, the Section 130 rail program, freight advisory committees, and the freight and state rail plan updates.

The Environmental Division is responsible for identifying, assessing, mitigating, and documenting environmental risks to the department on projects and operations from early project development to construction and maintenance. The division focuses on integrating environmental considerations and regulatory requirements into the department's transportation programs and operations, providing environmental (NEPA) documents and permits for department activities and

Appendix 3 (Continued)

projects, coordinating with regulatory agencies to streamline the environmental review and permit process, and providing a broad range of technical expertise in natural and human environments.

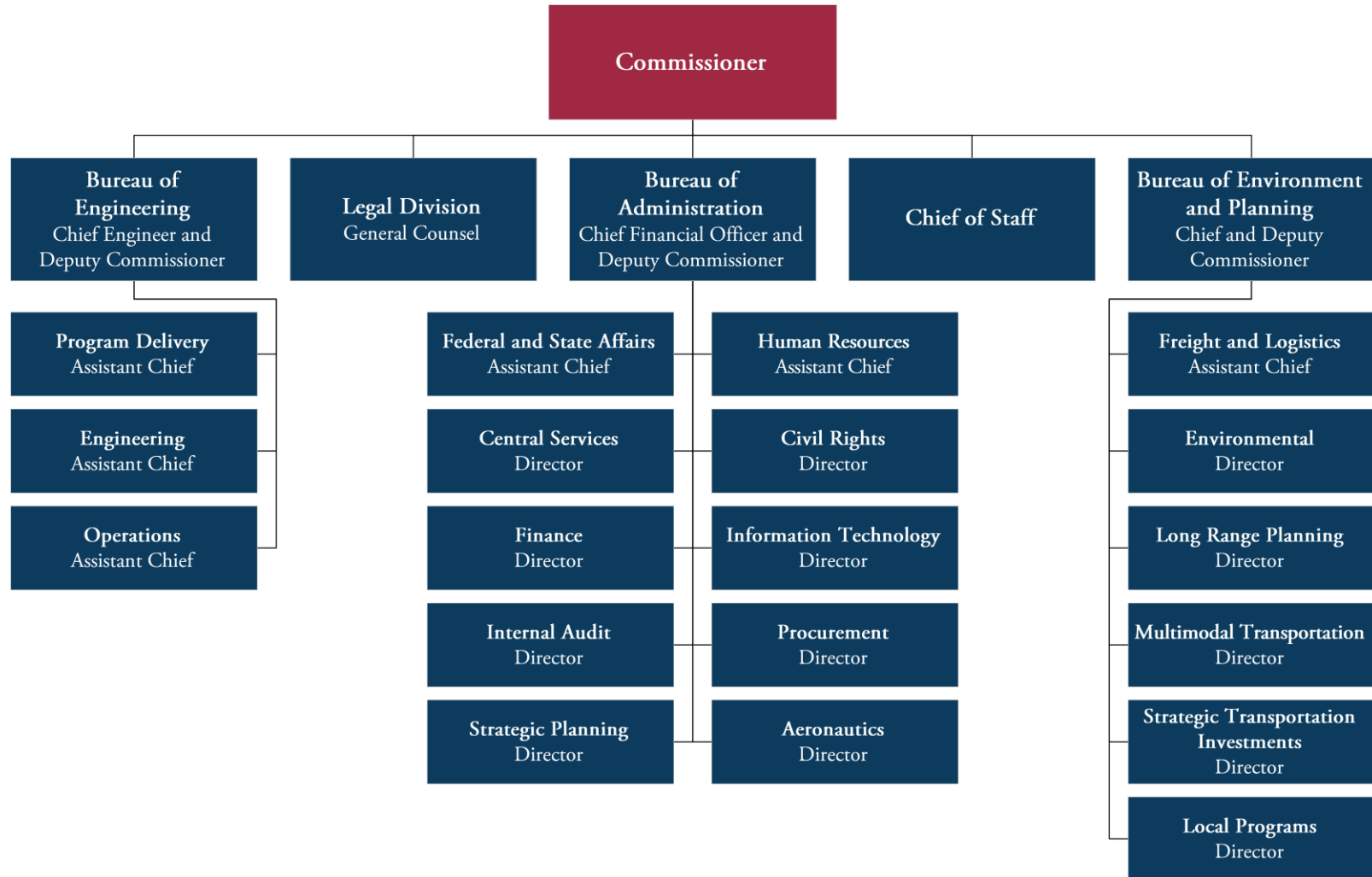
The Long Range Planning Division's mission is to play an active role in planning transportation strategies that improve safety, increase mobility, and encourage economic development in Tennessee. Long Range Planning is responsible for the planning, development, and management of statewide transportation studies and planning tools that help guide the policies and programs of the department and its divisions. Long Range Planning identifies transportation needs through the analysis of travel and safety data and engages the communities to obtain public input on transportation investments. Other responsibilities include developing the statewide long range transportation plan, university research, preparation of corridor studies, travel and data collection, feasibility studies and metropolitan and rural transportation planning and coordination, and GIS mapping and data visualization.

The Multimodal Transportation Division supports mobility for all through public transportation, bicycling and pedestrian infrastructure, complete streets, and transportation demand management. The Division's Office of Public Transportation administers state and federal transit grants; works in partnership with transit agencies to support ridership, mobility, and accessibility; and provides compliance oversight. The division is responsible for implementing the department's Multimodal Access Policy; administering the Multimodal Access Grant program; reviewing all projects for opportunities to expand pedestrian, bicycle, and low-speed mobility access; and facilitating communication with external stakeholders regarding multimodal issues.

The Strategic Transportation Investment Division provides strategic support for projects addressing the state's safety, congestion, and economic development needs. This includes the development of technical reports for the IMPROVE Act projects with the goal of performing engineering analysis of the existing transportation facility and making recommendations for improvements. The division also conducts operational analysis for non-highway transportation projects. Investments related to the work of this division determine new commitments the department makes. A "Needs Assessment Process" will determine the appropriate level of study and Project Prioritization which uses technical data, schedule, and cost to provide a prioritized list of major projects to assist in the development of the three-year multimodal transportation program. The division also conducts system and traffic analysis, manages and develops projects for the Roadway Safety Audit Program, implements projects for the Highway Safety Improvement Program, provides location identification and analyses of the crash database, and prepares conceptual design plans and cost estimates. In addition, the division conducts, facilitates, and supports various types of public involvement opportunities during the project development process.

Local Programs Division responsibilities are currently under development as the department continues to move to a matrix organizational structure.

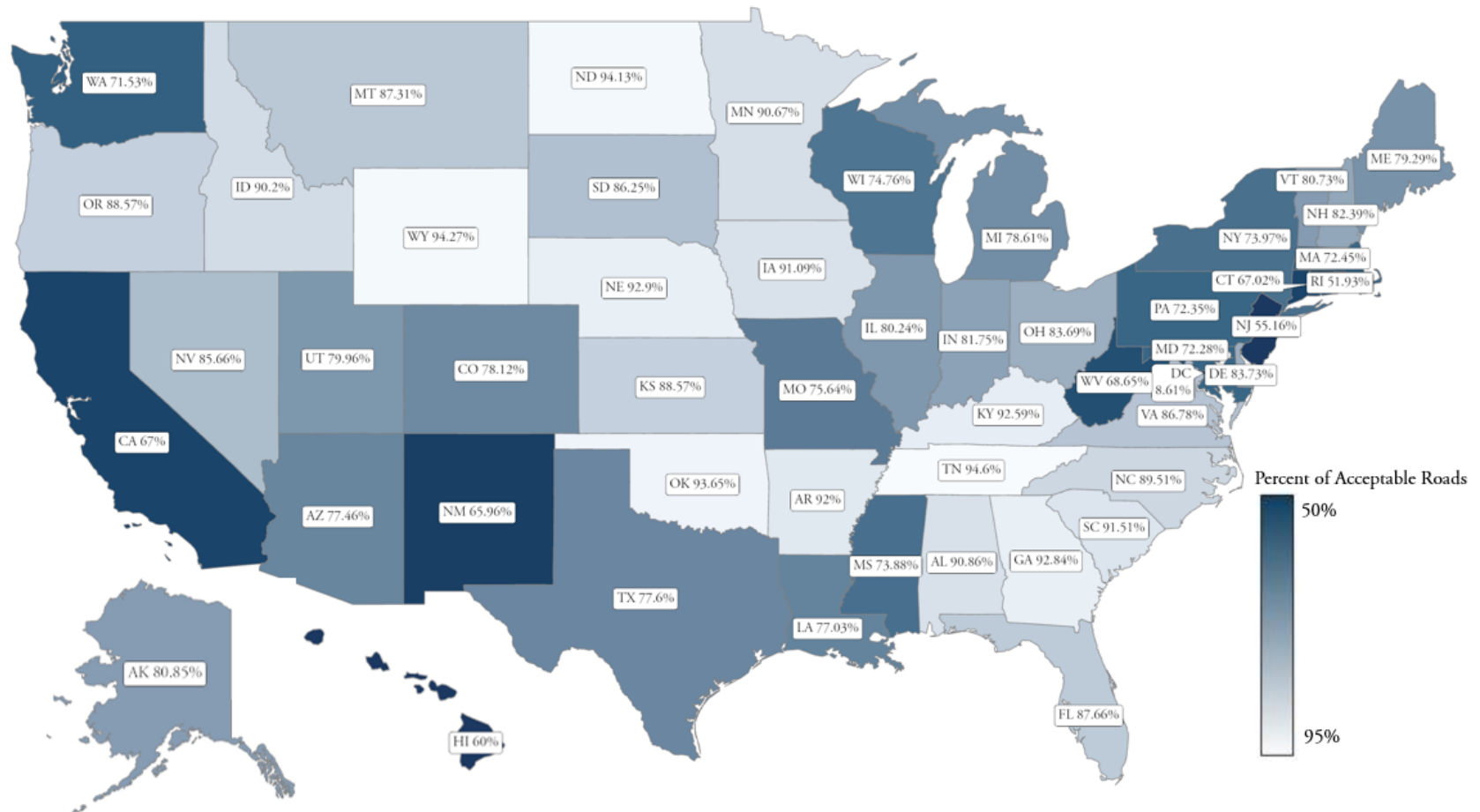
Appendix 4
Organizational Chart As of August 29, 2023



Source: Department management.

Appendix 5 Nationwide Road Conditions

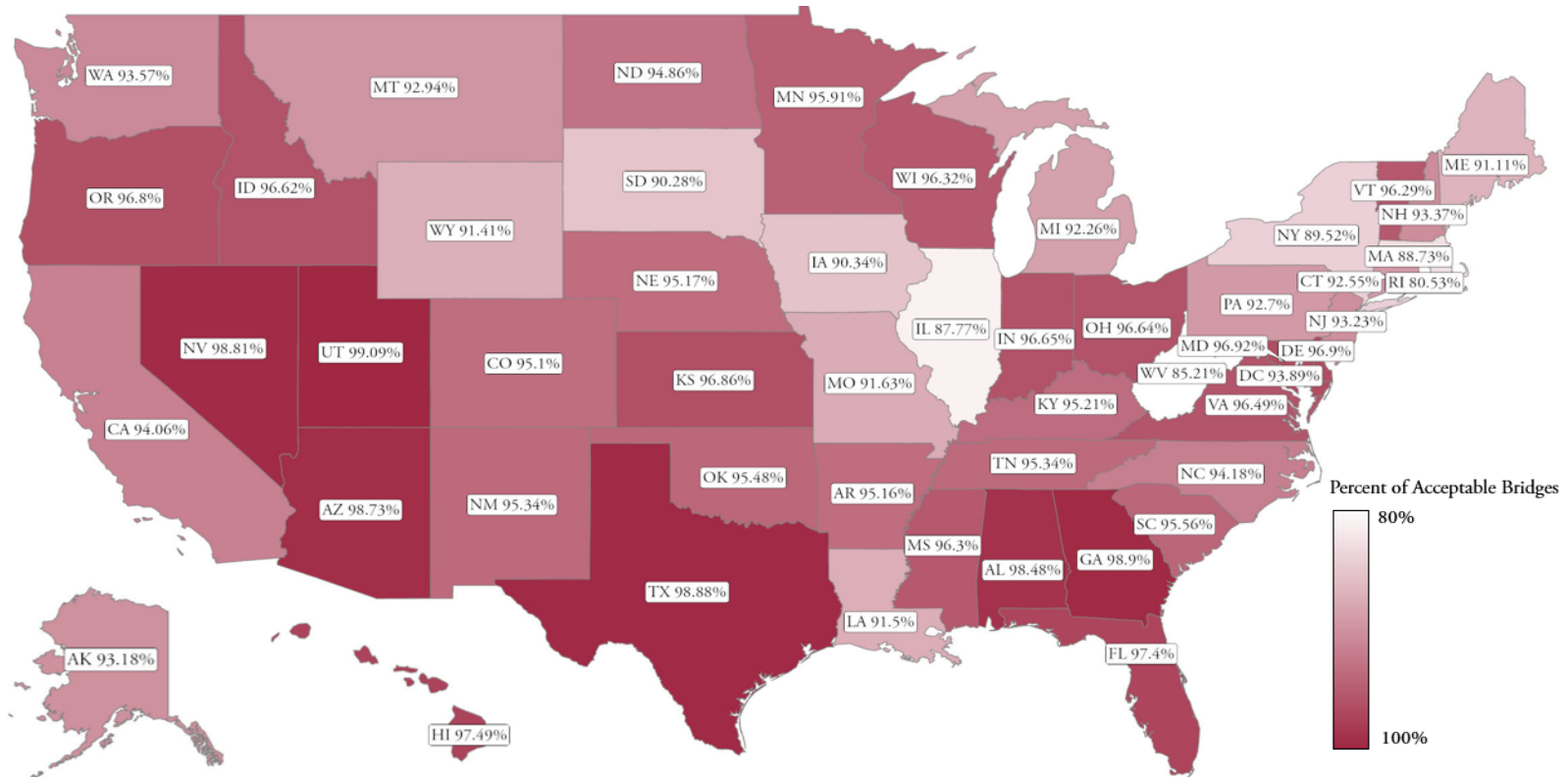
Exhibit 15
Percentage of Roads in Acceptable Condition



Source: Created by auditor based on data from the Bureau of Transportation Statistics.

Appendix 6 Nationwide Bridge Conditions

Exhibit 16
Percent of Bridges in Acceptable Condition



Source: Created by the auditor based on data from the Bureau of Transportation Statistics.

Appendix 7
Financial Information
Unaudited

Table 18
Department of Transportation
Fiscal Year 2020 Budget and Actual Expenditures and Revenues

Department of Transportation		FY 2020 Recommended Budget	FY 2020 Actual Expenditures and Revenues
Expenditures	Payroll	\$346,767,300	\$297,401,400
	Operational	1,948,385,200	1,904,791,700
	Total	\$2,295,152,500	\$2,202,193,100
Revenues	State	\$1,173,809,300	\$1,042,073,600
	Federal	1,074,169,600	1,120,319,100
	Other	47,173,600	39,800,400
	Total	\$2,295,152,500	\$2,202,193,100

Sources: Tennessee State Budget, Fiscal Year 2019–2020; and Tennessee State Budget, Fiscal Year 2021–2022 (Actual Expenditures and Revenues).

Appendix 7 (Continued)

Table 19
Department of Transportation
Fiscal Year 2021 Budget and Actual Expenditures and Revenues

Department of Transportation		FY 2021 Recommended Budget	FY 2021 Actual Expenditures and Revenues
Expenditures	Payroll	\$349,718,600	\$72,513,900
	Operational	1,923,207,300	171,962,400
	Total	\$2,302,925,900	\$244,476,300
Revenues	State	\$1,228,819,000	\$36,803,100
	Federal	1,035,345,600	198,814,700
	Other	38,761,300	8,858,500
	Total	\$2,302,925,900	\$244,476,300

Sources: Tennessee State Budget, Fiscal Year 2019–2020; and Tennessee State Budget, Fiscal Year 2021–2022 (Actual Expenditures and Revenues).

Table 20
Department of Transportation
Fiscal Year 2022 Budget and Actual Expenditures and Revenues

Department of Transportation		FY 2022 Recommended Budget	FY 2022 Actual Expenditures and Revenues
Expenditures	Payroll	\$358,535,700	\$399,782,700
	Operational	2,027,787,900	5,610,210,800
	Total	\$2,386,323,600	\$6,009,993,500
Revenues	State	\$1,312,590,600	\$4,511,703,500
	Federal	1,035,250,700	1,442,497,500
	Other	38,482,300	55,792,500
	Total	\$2,386,323,600	\$6,009,993,500

Sources: Tennessee State Budget, Fiscal Year 2021–2022; and Tennessee State Budget, Fiscal Year 2023–2024 (Actual Expenditures and Revenues).

Table 21
Department of Transportation
Fiscal Year 2023 Budget Expenditures and Revenues

Department of Transportation		FY 2023 Recommended Budget
Expenditures	Payroll	\$379,322,700
	Operational	2,809,185,500
	Total	\$3,188,508,200
Revenues	State	\$1,811,736,000
	Federal	1,338,388,100
	Other	38,384,100
	Total	\$247,304,700

Source: Tennessee State Budget, Fiscal Year 2022–2023.

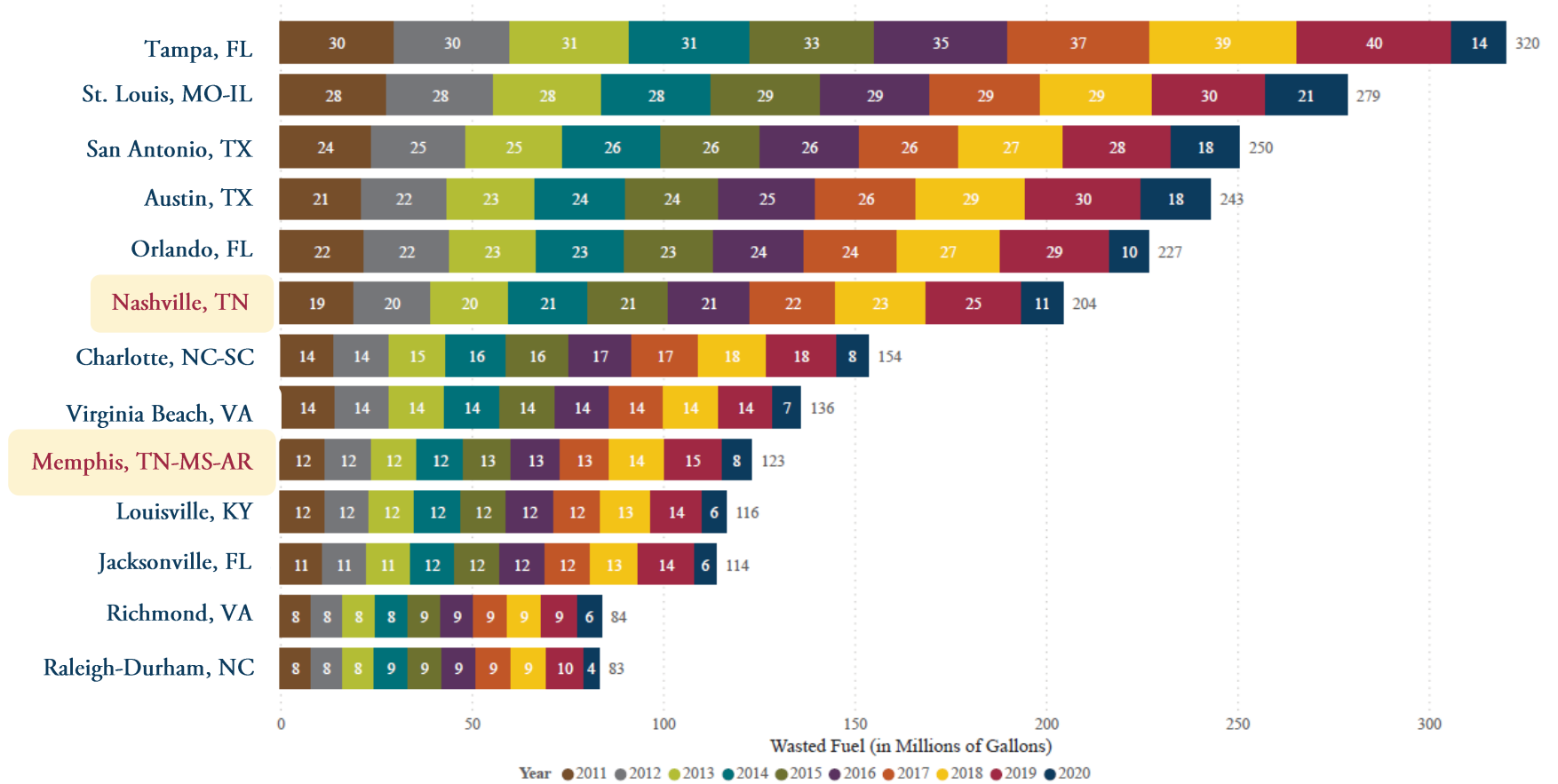
Appendix 8

Wasted Fuel Due to Congestion

Across the nation, traffic delays occur in urban areas for a variety of reasons. Congestion can be caused by traffic accidents, weather, or simply too many motorists using the same roads at one time. While many highway users have experienced frustration, congestion also results in wasted fuel and costs motorists each year. According to data from the Bureau of Transportation Statistics, congestion in both Nashville and Memphis has continued to grow, resulting in a total of 327 million wasted gallons of fuel between 2011 and 2020, as shown in **Chart 1**. Additionally, congestion has grown in other parts of the state, resulting in 68 million wasted gallons of fuel in Knoxville between 2011 and 2020, as shown in **Chart 2**.

Appendix 8 (Continued)

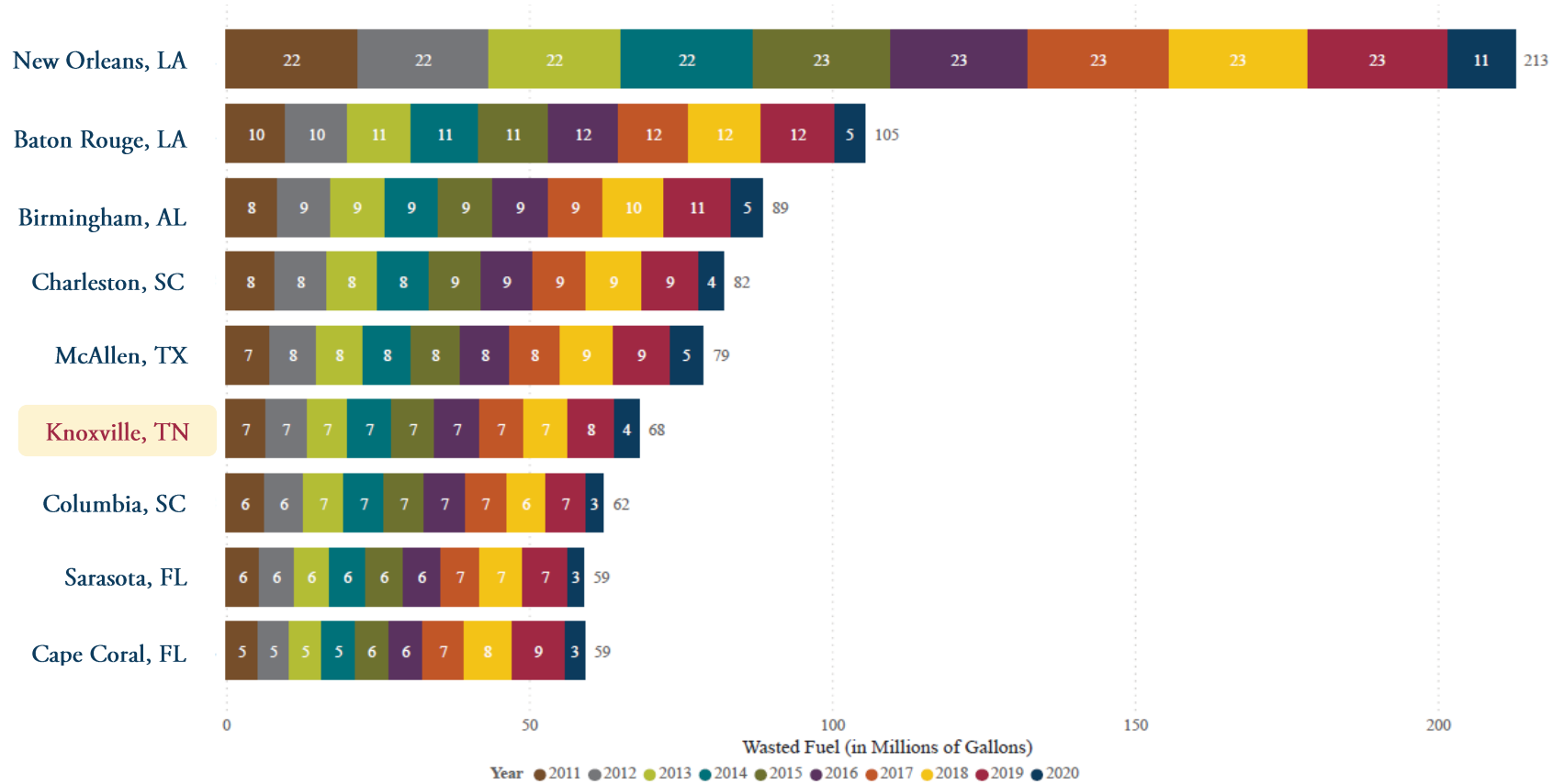
Chart 1
Wasted Fuel for Large Southeast Cities



Source: Created by auditor based on information from the Federal Highway Administration's Bureau of Transportation Statistics.

Appendix 8 (Continued)

Chart 2
Wasted Fuel for Medium Southeast Cities



Source: Created by auditor based on information from the Federal Highway Administration's Bureau of Transportation Statistics.

Appendix 9 Choice Lanes

Other states have shown that choice lane contracts have many options

The department was tasked with looking at the benefits of choice lanes in other states like Texas, Georgia, and Virginia. To gain an understanding of choice lanes, including user fee pricing and funding methods, we reviewed choice lanes in the following states: North Carolina, Georgia, Texas, and Virginia. Using information from the Federal Highway Administration, we compiled a comparison of specific choice lanes projects in North Carolina, Georgia, Texas, and Virginia. Each state uses different contracting methods and operates choice lanes in varying ways. We also saw prices vary from state to state. See Table 22 for an overview of the lanes we reviewed. In North Carolina, choice lane revenue pays the choice lane company's original investment but also pays for the maintenance of the other general-purpose lanes along I-77. North Carolina's user fee contract has a feature available to the choice lane company if the choice lane revenue does not cover the operational costs and initial debt. In Georgia, the choice lane agreement is set up so the Georgia Department of Transportation (GDOT) is responsible for operating and maintaining the choice lanes.

Table 22
Choice Lane Projects in Different States

State	Year Construction Started	Project	Number of Miles	Number of Lanes	Time to Build	Contract Length
North Carolina	2015	I-77	26	3	3 years	50 years
Georgia	2014	I-75 Northwest Corridor	29.7	3	4 years	GDOT operates and maintains
Texas	2011	LBJ Express	13	12	4 years	52 years
Virginia	Original: 2012 Extension: 2019	I-95	29.4	2 new, 8 existing	3.5 years	Original: 76 years Extension: 68 years

Source: Created by auditor based on data from the Federal Highway Administration's Center for Innovative Finance Support: Project Profiles database.

User Fee Pricing

The ability to see choice lane pricing when planning a trip varies by state

We noted that multiple states that use choice lanes have a website that explains how to use the choice lane and shows a map of where to enter and exit a choice lane. Some choice lane websites offer the feature to calculate the price to use a choice lane between two destinations. Of the websites that allow a potential user to calculate price, some gave real-time pricing while others provided historical averages. We gathered our choice lane rate data by planning trips during peak traffic hours.⁶⁷ Of the states we reviewed, Georgia's Peach Pass choice lane website offered the most accurate and real-time user fee rates.

Georgia's choice lanes had the lowest prices of the four we reviewed

The PeachPass website offers real-time rate tracking that shows users how much they will pay to use the choice lane. **Figure 26** shows Georgia's I-75 South Metro Express Lane, where the user fee changed quickly to adjust to changing traffic congestion. In ten minutes, the user fee for this entrance to the choice lane increased by \$0.35 and \$0.30 cents. **Figure 27** shows that the user fee in **Figure 26** decreased as morning traffic decreased for the same choice lane.

Figure 28 shows Georgia's I-85 Express Lane's user fee changed between 3:00 p.m. and 4:00 p.m. After three days of monitoring Georgia's I-85 Express Lane between 7 a.m. and 5 p.m., we noticed that the maximum choice lane user fee never rose beyond \$16, as shown in **Figure 29**. It is important to note that Georgia has multiple choice lanes where the user fee ranges from two to seven dollars.

Figure 26
I-75 South Metro Express Lane: User Fee Variation Over a Ten-Minute Timespan



Source: Screenshot obtained on Monday April 24, 2023, from the PeachPass website.

⁶⁷ Based on auditor judgment, we identified peak traffic hours as the hours from 7 a.m. to 9 a.m. and 3 p.m. to 5 p.m.

Figure 27
I-75 South Metro Express Lane: User Fee Decrease



Source: Screenshot obtained on Monday April 24, 2023, from the PeachPass website.

Figure 28
I-85 Express Lane: User Fee Variation Over a One-Hour Timespan in Traffic



Source: Screenshot obtained on Monday April 24, 2023, from the PeachPass website.

Figure 29
I-85 Express Lane: Maximum Fee



Source: Screenshot obtained on Monday, April 24, 2023, from the PeachPass website.

Texas has more than 120 miles of choice lane corridors in the Dallas-Fort Worth area alone

Texas has multiple types of choice lanes throughout the state with varying contract terms. Because the Tennessee Department of Transportation management studied the success of Texas' LBJ TEXpress choice lanes, we looked at the pricing structure for these lanes. **Table 23** shows an example of a 19.4-mile trip in the downtown Dallas, Texas, area utilizing the LBJ TEXpress⁶⁸ choice lanes. The table shows how it is more expensive to travel from downtown Dallas to the surrounding areas in the mornings. We noted that the user fee did not have much variation throughout the day. According to the TEXpress website, the dynamic pricing system TEXpress uses is meant to allow traffic to flow freely at a minimum of 50 miles per hour; once traffic volume drops, the price goes down.

Table 23
Example of LBJ TEXpress Lane Rates in Dallas, TX

Location	6:00 a.m.	7:00 a.m.	8:00 a.m.	9:00 a.m.	10:00 a.m.	4:00 p.m.	5:00 p.m.	6:00 p.m.	7:00 p.m.	8:00 p.m.
City Hall to Whole Foods	\$19.88	\$27.20	\$27.20	\$26.22	\$22.06	\$27.20	\$27.20	\$27.20	\$22.16	\$13.56
Whole Foods to City Hall	\$12.05	\$13.60	\$13.60	\$13.21	\$11.14	\$13.10	\$13.10	\$13.10	\$9.57	\$6.22

Source: Created by auditor with data from TX Lane Rate Data.

We saw prices range from \$20 to \$34 on Virginia's I-95 choice lane

The Virginia Department of Transportation partnered with Transurban, a choice lane company, to extend choice lanes on routes into Washington D.C., to lower congestion on I-95. We viewed the cost of using a choice lane from Washington D.C. to I-95 near Courthouse Road. The estimated total for the 43-mile trip was \$34.25 at 3:30 p.m. EST. We noted that this choice lane is a reversible lane; the lane runs northbound toward D.C. in the mornings and southbound, leaving D.C. during the evenings. We determined that prices constantly range from \$20 to \$34 during peak traffic hours. It is important to note the disclaimer on the trip calculator, which states that the user fee could change within a five-minute span and that vehicles over seven feet tall pay three times the stated amount.

⁶⁸ LBJ TEXpress is the name of one of the Choice Lanes in Dallas, Texas, operated by the LBJ Infrastructure Group.

Funding Source

Even in Public-Private Partnerships, there are different ways to fund choice lanes

Throughout our research of choice lanes in North Carolina, Texas, Georgia, and Virginia, we noted multiple funding sources for each of the choice lanes. Some commonly used funding sources include

- Private Activity Bonds (PABs): PABs are instruments authorized by the Secretary of Transportation for highway and freight transfer projects, allowing a private project sponsor to benefit from the lower financing costs of tax-exempt municipal bonds. These bonds are at the cost of the contracting company to issue and not at the state's expense.
- TIFIA Loans: The Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides federal assistance in the form of loans, loan guarantees, and lines of credit for project sponsors to finance surface transportation projects of national and regional significance. These loans are for the contracting company and not at the state's expense.
- Equity: Equity is funding provided by a private company.
- State funds: States provide funding through various means like motor fuel taxes and general fund transfers.

States use a variety of other funding sources, including interest income, issuing bonds, state loans, and others.

Table 24
Funding Sources Used by States
in Millions

State	Total Cost	PABs	TIFIA Loans	Equity	State Funds	Other
North Carolina	\$636	\$100	\$189	\$248	\$94.7	\$4.1*
Georgia	\$833.7	-	\$275	\$59.9	\$498.8	-
Texas	\$2,600	\$606	\$850	\$682	\$490	\$17†
Virginia (2012)	\$922.6	\$252.6	\$300	\$280.4	-	\$89.7‡

Source: Created by auditor based on data from the Federal Highway Administration's Center for Innovative Finance Support: Project Profiles database.

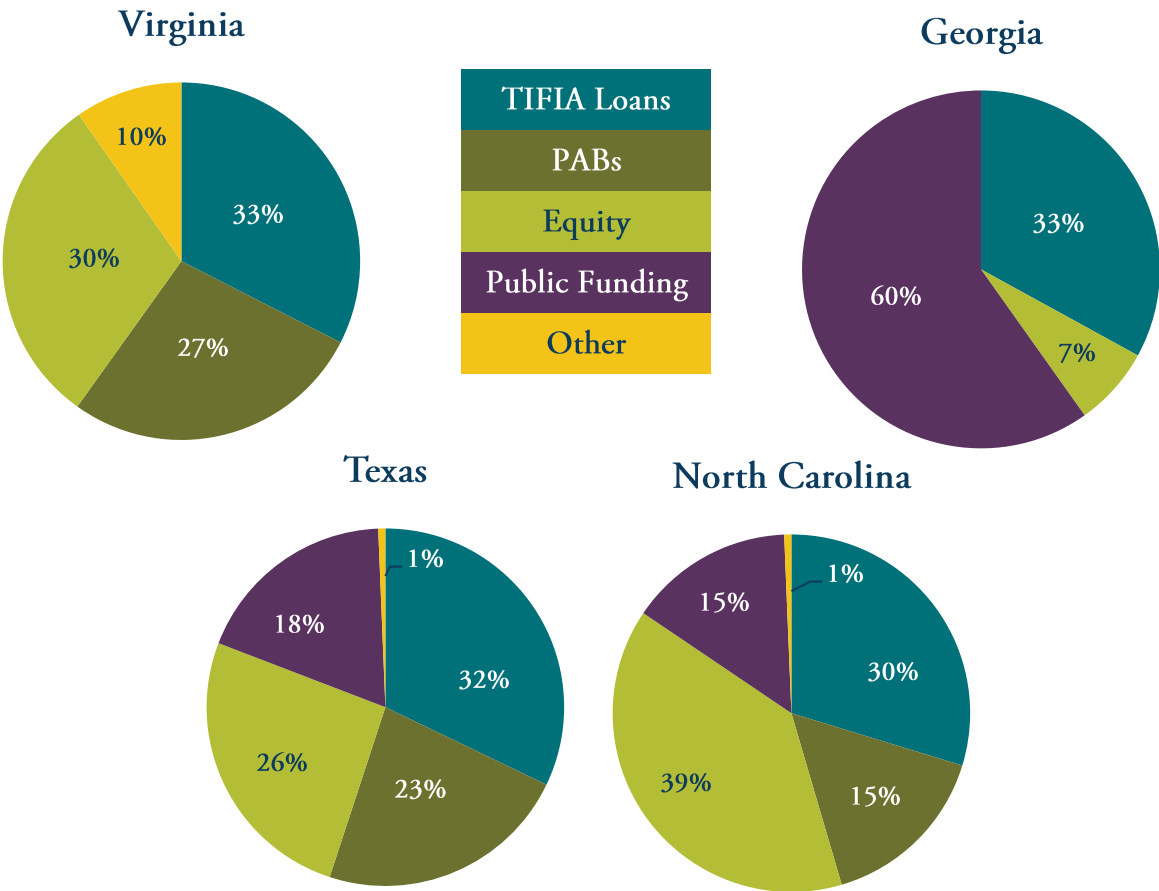
* This consists of \$0.5 million in interest income and \$3.6 million in bond premiums.

† This amount is the toll revenue collected during construction.

‡ This consists of \$82.6 million from Commonwealth of Virginia grants and \$7.1 in interest earnings.

Table 24 and Exhibit 17 show funding sources for each state we reviewed. As evidenced by the table, states can use a variety of funding sources in a choice lane contract.

Exhibit 17
Funding Sources by State



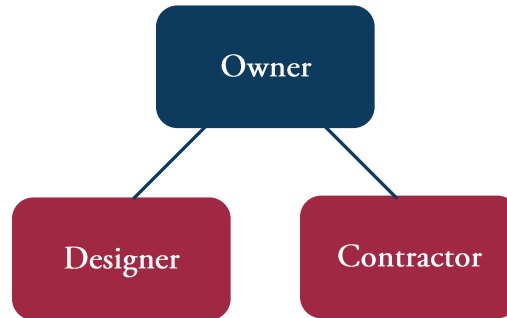
Source: Created by auditor based on data from the Federal Highway Administration’s Center for Innovative Finance Support: Project Profiles database.

Appendix 10

Project Delivery Methods

The **Design-Bid-Build (DBB) method**, also known as the traditional method, is historically the most common way to build a construction project from start to finish. The department will prepare the design plans independently or with the help of a design firm and will advertise the project and take bids. The construction company with the lowest overall bid that meets all requirements will build the project, as shown in **Figure 30**. With DBB, the department retains the highest level of control over the project but also assumes the highest level of risk if problems occur during construction. Since the department is the owner of the project and assumes liability for the project's design, the department is responsible for the cost of any changes required during construction.

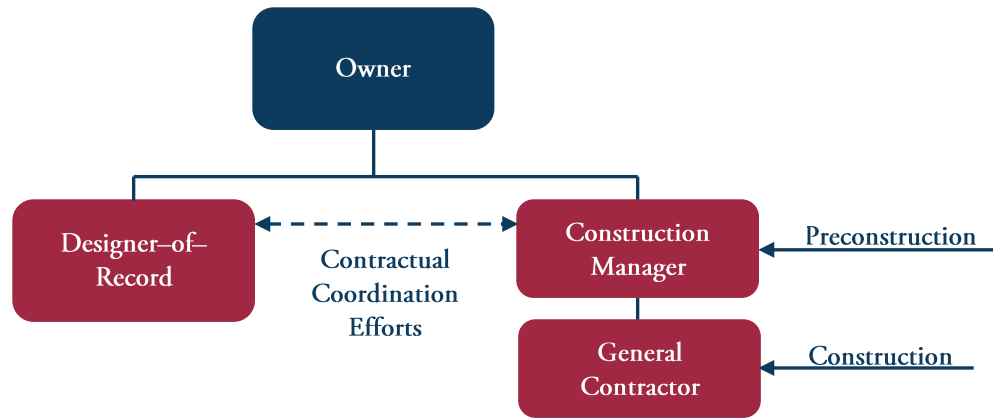
Figure 30
Design-Bid-Build Structure



Source: The department's Build With Us, Delivery, Fact Sheet.

With the **Construction Manager/General Contractor (CM/GC)** delivery method, the department and the construction company work together with a design consultant, as shown in **Figure 31**, to design the project and then create a cost estimate of the project to minimize risk. Both parties negotiate the guaranteed maximum price to deliver a project and are responsible for planning for unforeseeable risks that may arise later in construction. With CM/GC, the department has the benefit of getting a contractor's experience and input in the design phase of a project, and the estimated cost to build the project is more accurate. The department has an official process for selecting contractors best suited for the project and evaluates contractors on criteria such as a contractor's qualifications and experience, prior experience/performance, safety, and risk management. CM/GC also gives department management the opportunity to take the completed design plans and switch to the traditional Design-Bid-Build method with a different contractor if needed.

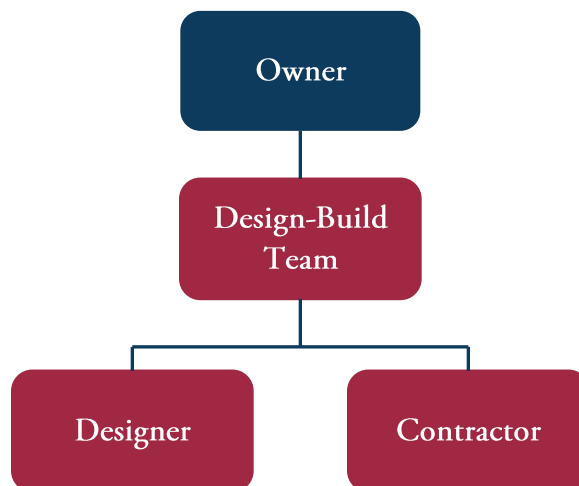
Figure 31
Construction Manager/General Contractor Structure



Source: The department's Build with Us, Delivery, Fact Sheet.

The **Design-Build (DB) method** allows the department to work with a single contractor who provides the design and construction services, as shown in **Figure 32**. This method helps produce a faster schedule that allows for the accelerated completion of projects and allows for early contractor involvement with a single point of accountability. In Design-Build, contractors submit bids to the department that show the cost of services and how many days the project will take to finish. The department reviews contractor bids and awards projects based on criteria outlined in Rule 1680-05-04 of the *Rules and Regulations of the Tennessee Department of Transportation*, Construction Division.

Figure 32
Design-Build Structure



Source: The department's Build with Us, Delivery, Fact Sheet.

Appendix 11

Department of Transportation Road Construction for BlueOval City

General Background

In 2009, the Tennessee General Assembly created Section 64-6-110, *Tennessee Code Annotated*, which gave the Department of Economic and Community Development (ECD) the authority to create the Memphis Regional Megasite (the Megasite). ECD identified a viable location for the Megasite in Haywood County, which is in rural West Tennessee, about an hour from Memphis, with direct rail and interstate access from I-40. The State of Tennessee has invested more than \$174 million in the 4,100-acre Megasite for industrial development.

In 2021, the Tennessee General Assembly created the Megasite Authority of West Tennessee under Section 64-9-101 et seq., *Tennessee Code Annotated*. The authority has the power to oversee the site, execute contracts, acquire property, and improve the grounds within the Megasite, including constructing roads, buildings, and utilities. An 11-member board of directors, created under Section 64-9-105, *Tennessee Code Annotated*, governs the authority.

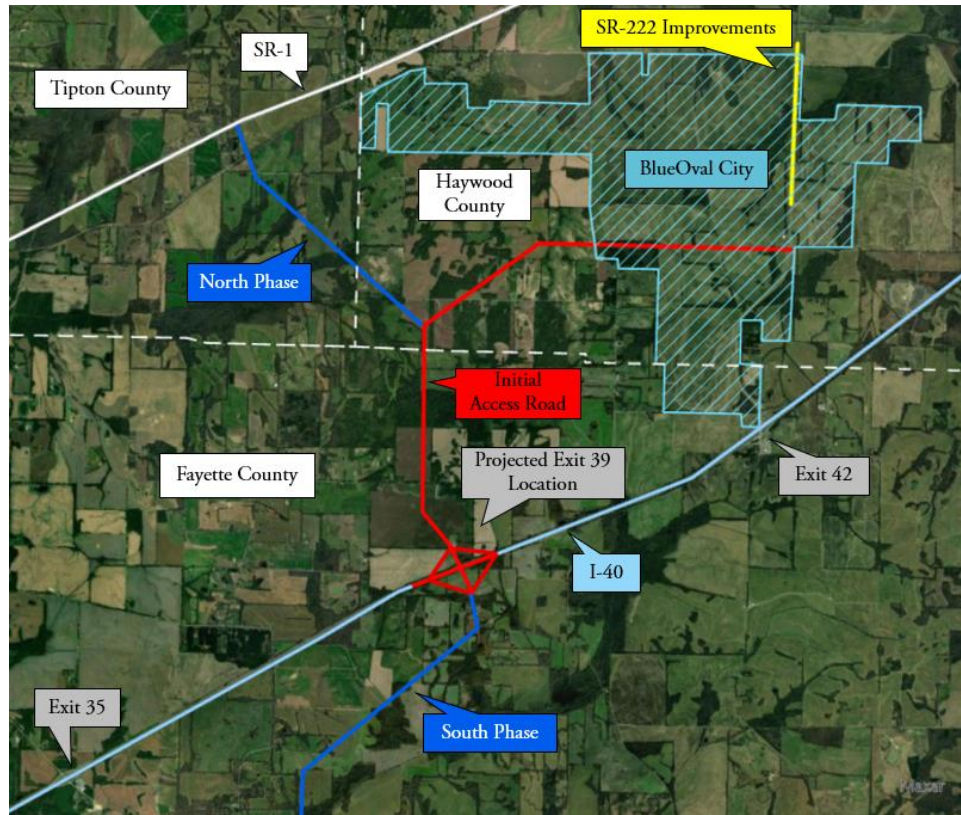
On September 27, 2021, Governor Bill Lee announced that Ford Motor Company (Ford) had selected the Megasite for a vehicle and battery manufacturing campus. The Megasite, now also called BlueOval City, is expected to begin industrial operations in 2025, with plans to employ 5,760 people.

The Department's Involvement in BlueOval City

On September 27, 2021, ECD and Ford entered into a memorandum of understanding (MOU) that outlines the responsibilities of each party. The MOU also details the Department of Transportation's construction of new road improvements around BlueOval City. In chronological order, this project includes **work on an initial access road and access to I-40**; two additional roadwork improvements, including **widening SR-222** and **modifying Exit 42**; a **south phase**; and a **north phase**, as described below and exhibited in the map in **Exhibit 18**.

The MOU specifies that the access road will be available for public use by January 31, 2025. Initially, Ford wanted all road improvements completed no later than July 1, 2026, but changed the date to November 30, 2028, after discussions with management of the department and the Megasite Authority. See **Figure 33** on page 150 for a complete project timeline.

Exhibit 18
Map of BlueOval City Road Projects



Source: Created by auditor based on the department's BlueOval Map Timeline.

Initial Access Road and Access to I-40⁶⁹

In the first phase of the project, the department will oversee the building of an access road through BlueOval City and a new interchange on I-40. The department expects to begin construction on this phase on February 8, 2024, with the initial access road opened to the public by January 31, 2025. When this road is open, it will be a two-lane, paved road that will connect to SR-222 and allow access to I-40 via the current exit, Exit 42. Upon full completion, the road will become the BlueOval City Connector and will be a four-lane, median-divided road for the entire route through BlueOval City. To accommodate the increased traffic and freight volumes expected on I-40 once the Megasite project is complete, the department must also construct a new exit on I-40 near mile marker 39 in Fayette County. The department expects to complete all parts of this phase in mid-2027.

⁶⁹ The department refers to this as the G1 phase.

Additional Roadwork Improvements

According to the department, their additional work to widen SR-222 and modify Exit 42 is intended to address the projected increase in traffic and improve the transportation network within the region. Both projects are currently in the preconstruction stage.

Widening of SR-222

Because SR-222 is currently the only route to the interstate, the department expects congestion from BlueOval City near current Exit 42 on I-40 until the new exit is completed. SR-222 will undergo reconstruction and widening due to changes in employee and freight entrances into the plant. The department is currently in preconstruction for this project and plans to start construction on February 22, 2024, and finish by the end of 2025.

Exit 42 Modifications

To help ease expected congestion from freight and increased traffic, the department will modify the current Exit 42 to ensure interstate access remains reliable until the new exit is completed. Exit 42 will be modified for safety to include more turn lanes on and off I-40, longer exit ramps, and wider shoulders. The department is currently in preconstruction for this project and plans to start construction on June 18, 2024; like the SR-222 widening project, the department plans to finish by the end of 2025.

The South Phase⁷⁰

The south phase will connect BlueOval City to a secondary route south of the Megasite. This route will extend southern access beyond the new Exit 39 by creating a two-lane road from this exit that connects to SR-59. The department is currently in preconstruction for this phase and plans to begin construction on February 17, 2025. The road is expected to be open to the public by late 2027.

The North Phase⁷¹

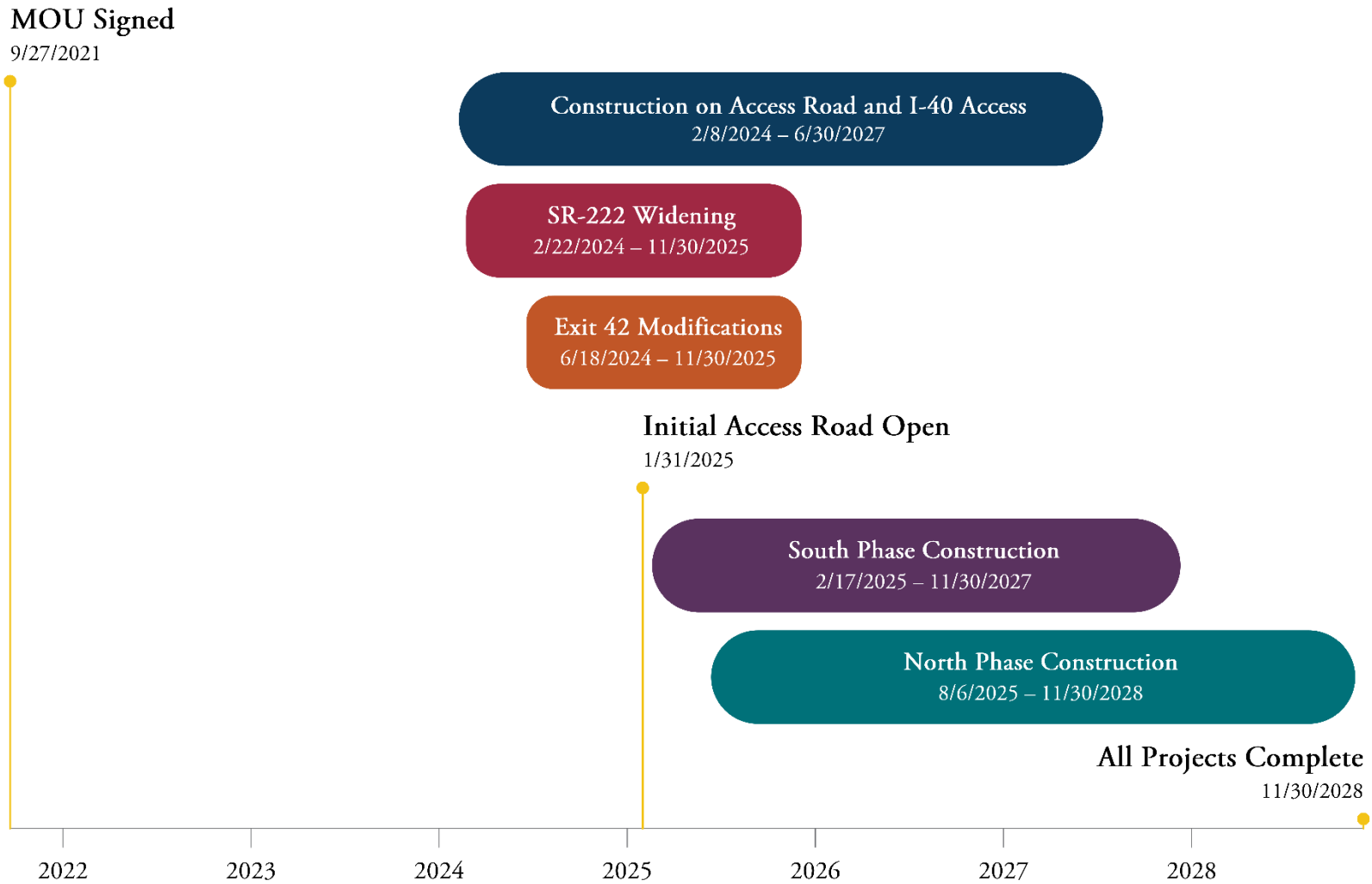
The north phase will connect BlueOval City to a secondary route north of the Megasite. This route will be a two-lane road north of the BlueOval City Connector and will provide access to SR-1 (US-70). The department is currently in preconstruction for this phase and plans to begin construction on August 6, 2025. The road is expected to be open to the public by late 2028.

See **Figure 33** for a timeline of all project completion dates.

⁷⁰The department refers to this as the G2 South Phase.

⁷¹The department refers to this as the G2 North Phase.

Figure 33
Timeline for Project Completion Dates



Source: Created by auditor based on project construction dates provided by the department's BlueOval City Manager.

Appendix 12

2019 Rail Safety Inspection Program Top to Bottom Review Executive Summary, Conclusions, and Recommendations

We have included excerpts from the 2019 *Rail Safety Inspection Program Top to Bottom Review* in this appendix. Specifically, we have included the **executive summary, conclusions section, and recommendations section** of the report to identify areas of concern noted in the review so that the reader can identify the similarities between the *Top to Bottom Review* recommendations and the conclusions and recommendations made in our report.

Executive Summary

The purpose of this study (the Study) conducted by HDR Engineering, Inc., was to assess the effectiveness of the Tennessee Department of Transportation's (TDOT) Railroad Safety Inspection Program (Program). The review encompassed both the inspection of railroad crossings pursuant to state law and the inspection of rail system elements in partnership with the Federal Railroad Administration (FRA). The intent was a review of all practices of the Program in determining the best course of action and use of resources in the Department for the safety of the traveling public and railroad operating employees. The ultimate goal was to identify how TDOT can best use its resources to improve rail safety statewide, within the current statutory requirements, staffing levels and available funding.

HDR independently reviewed Tennessee's existing railroad safety inspection practices, analyses, and planning. HDR developed recommendations drawn from best practices in other states, interviews with key participants and subject matter experts to improve the institutional and organizational sustainability of the Program. The Study compared the safety results achieved in other states that also participate in the FRA's Railroad Safety Program, a voluntary federal and state partnership, and analyzed the performance of Tennessee's Rail Safety Program in recent years. The Study detailed the present scope of Tennessee's railroad and crossing safety programs, and contrasted the state's program to programs in other states. Additionally, HDR performed a general analysis of Tennessee's rail safety performance for the 2009-2017 period and compared these safety trends with those in other states (including those with and without rail safety programs)

The Study identified recommendations for the Program that, if implemented, will improve the program's overall effectiveness. Without the requirements of state law and dedicated funding, an alternative would be to eliminate the Railroad Safety Inspection Program and allow FRA to be solely responsible for the inspection of railroads in Tennessee. This is a choice some states have made, but it would need to be done in recognition of the potential risks, which were not assessed by this study.

The Study concluded the following:

- There is state law that provides TDOT authority and, consequently, responsibility to perform inspections of railroad rights-of-way, in rail yards and terminals, and at rail loading and unloading facilities connected to railroad property. TDOT is unrestricted to conduct these inspections as it thinks proper and as resources allow.
- The Ton-Mile Fee imposed on railroads provides a dedicated funding source which produces surplus annual funding levels and a reserve of available funds. Based on state law, this fee paid by the railroads is "assessed against the actual ton-miles operated annually by each railroad in this state".
- Based on analysis of recent accident/incident data, the majority of Train Accidents (excluding grade-crossings), occur in yards or high-activity areas that include the movement of individual rail cars.
- A large portion of incidents occur at highway-rail crossings and the Program applies upwards of 50 percent of the inspection resources toward highway-rail crossing inspections. The Program's inspections focus on the crossing surface within ten feet of the track because it is the area specifically cited by state law for enforcement and is the subject of most public complaints. However, review of past incident reports do not cite crossing surface as a cause of incidents. Consequently, a large amount of the inspection resources are directed where incident data does not support the need.
- The current Program management practices and tracking systems appear to be inefficient and lack data driven planning, clear purpose, and accountability in comparison to other state programs and FRA guidelines reviewed.
- Performance metrics are associated with each inspection position, but based on information provided for the study, metrics are not based on any inspection or accident data analysis to determine where best to apply resources. •
- Inspectors generally develop their own inspection plans in the form of a weekly itinerary, but the itinerary lacks work details and there is no real-time tracking of the inspectors' daily activities.
- There is no formal coordination between FRA and TDOT on work to be accomplished to avoid redundancy and to maximize coverage of inspection priorities.
- Staff retention is difficult due to the current pay levels of the inspection positions compared to FRA inspectors. This is a significant risk to the sustainability of the current program.
- From the review of accident/incident rate trends, Tennessee is performing favorably in terms of downward trending accident rates relative to other states. States with FRA safety programs fared better in lowering accident rates over time compared to the states without the safety programs for those accidents that exclude crossings. However, when crossing

Appendix 12 (Continued)
Excerpts from the 2019 Rail Safety Inspection Program Top to Bottom Review

data is included, states with the FRA safety programs lose their statistical advantage over states without safety programs. This suggests that observed accident trends may not be solely attributable to safety programs in partnership with FRA.

Recommendations that should be prioritized for the Program are summarized as follows:

- Based on the dedicated funding and obligation under state law, it is recommended the Program continue to inspect railroads and partner with FRA, provided operational and process improvements are made to best utilize the funds available.
- The current goal of the Rail Safety and Inspection Office is to reduce and eliminate dangerous/hazardous conditions for railroad employees and the general public. However, there needs to be a clear mission statement and measurable goals. Objectives should be defined to establish a data driven process to be used to set priorities, goals, and performance metrics for the routine management of the Program.
- Establish annual Program goals and performance metrics based on review of past inspection and incident data. Track and update these quarterly.
- Revise and update the Inspection Operations and Procedural Manual. Additionally, the manual should be available electronically online.
- Establish Program processes and systems for real-time Program reporting to provide management a basis for decisions and transparency for the public and railroads the Program serves.
- Develop and incorporate data collection, analysis, tracking and reporting tools that are customized to fit the Program. In the interim, and as a minimum, follow FRA procedures outlined in the Managers Handbook for that purpose.
- Expand the scope of the state crossing inspections to include all or many of the features included in the new FRA crossing inspection discipline or as needed to assist the separate Federal Highway-Railroad Grade Crossing Program (Section 130) and update the FRA crossing database. The Railway-Highway Crossings (Section 130) Program is managed separately at TDOT for administering Federal funds for the elimination of hazards at railway-highway crossings.
- Based on the data analyzed for this study, provide for a full-time Operating Practice Inspector and a future additional Track Inspector to address safety concerns.
- Create a Field Supervisor Position to be responsible for the routine management of the inspection team. This will allow transition of the Rail Safety Manager position to a Program Manager role that focuses more on management of the Program in collaboration with Division and Department leadership to develop and implement the programmatic recommendations.

- For a more sustainable staff, raise compensation levels to be more competitive with FRA pay rates. This has been done successfully with elevating performance measures by other states. Leverage the significant experience of the current staff to train new inspectors for obtaining FRA certifications.
- Develop a quarterly inspection plan for each inspector that is based on analysis of current data. These may be revised monthly as new priorities are established, but it will assure that inspections for the quarter will align with overall, and possibly, annual goals for the Program.
- Management, not inspectors, should compile a quarterly report, as currently required by FRA, from monthly inspection reports provided by each inspector, with sufficient data to assess past work and plan future inspections. In addition to actual inspection reports and associated reports for defects and violations, the monthly inspection report is all that should be required of the inspectors.
- Develop a formalized collaboration and coordination plan between the Program and FRA. Communication of the Program should not be limited to the essential coordination with railroads and FRA, but also to TDOT leadership, the State legislature, other TDOT divisions, rail safety stakeholders, and the general public.

These and other potential recommendations presented in this Study regarding improved railroad safety program effectiveness can be generally achieved through prioritized changes within the state's program. TDOT is advised to develop an action plan that includes the conclusions and recommendations from this Study, dovetail them with internal goals and vision, and to create benchmarks to measurable progress; and in turn, improve the overall railroad safety within the state.

8 Conclusions

From review of all information collected by the study, certain conclusions can be drawn that will facilitate the development of an appropriate path forward for the Program.

1. State law provides TDOT authority and, consequently, responsibility to perform inspections of railroad rights-of-way, in rail yards and terminals, and at rail loading and unloading facilities connected to railroad property. Crossing inspections are not specifically required by state law, but are needed to fulfill TDOT's duty to enforce state law requiring Railroads to keep crossings in good repair. There is also dedicated funding through a State fee on railroads based on ton-miles of operations, producing a surplus of annual revenue and a reserve of available funds. These funds can be used to perform inspections of railroad rights-of-way, in rail yards and terminals, and at rail loading and unloading facilities connected to railroad property. TDOT is unrestricted to conduct these inspections at their discretion and as resources allow.

Appendix 12 (Continued)
Excerpts from the 2019 Rail Safety Inspection Program Top to Bottom Review

2. In review of the rail accident data (not at grade-crossing), Tennessee performed better than other states with and those without a rail safety inspection program partnering with FRA for training (See Figures 7-1 and 7-2). The trend of accidents for the period investigated favors those states with safety programs in partnership with FRA, however the actual rate may vary. It should be noted that when highway-rail crossings are considered, the statistical trend is reversed (See Appendices). This could be due to the predominate cause of those incidents being human related. Regardless, no strong conclusion should be drawn in correlation between accident data reviewed for this study and benefits of a safety program in partnership with the FRA. Regardless, there are certain qualitative advantages to maintaining a state rail inspection program. Railroad defects are often detected by qualified FRA certified inspectors and the Program provides accountability of railroad safety on the specific railroads inspected.
3. In review of Tennessee's accident/incident data, most incidents are categorized as Other Accidents/Incidents, which are events other than train- or crossing- related incidents and are primarily the result of human factors and not easily addressed by the inspection program. Of those that would be most closely associated with the FRA Inspection disciplines, derailments in rail yards are the majority. Highway-Rail crossing incidents also represent a significant amount of the total accidents/incidents reported and should remain a priority for the Program.
4. The FRA inspection disciplines focus primarily on the prevention of accidents/incidents associated with train operations along railroad track, which represents "Train Accidents (Not at Grade-Crossing)", while providing a limited focus on the prevention of grade train/vehicle accidents. TDOT does address this by performing state crossing inspections, but with limited scope and uneven coverage. Recently the FRA added a Highway-Rail Grade Crossing discipline to help increase the safety and prevention of train vehicle collisions, however most existing state highway-rail programs, as with Tennessee's highway-rail inspections, have yet to incorporate or update their Program with this added discipline.
5. The FRA inspections and the state crossing inspections are focused on enforcement and status of railroad infrastructure and practices. They provide little or no benefit in the prevention of accidents/incidents defined as "Other Accidents/Incidents", which represents approximately 50 percent of all accidents/incidents. Public safety education and awareness programs may be more effective in reducing collisions, fatalities and injuries at Highway-rail crossings and trespassing on or near railroad tracks involving human factors.
6. Based on analysis of recent accident/incident data, the majority of Train Accidents (Not at Grade-Crossing) by location occur within their yards or high- activity areas that include the movement of individual rail cars. For this reason, inspections should prioritize and focus on those locations rather than segments of main line track.

Appendix 12 (Continued)
Excerpts from the 2019 Rail Safety Inspection Program Top to Bottom Review

7. While Tennessee does not have the lowest accident rate, there are a variety of factors that affect this, including Tennessee's greater diversity of climate, geography, population density and distribution, average train volumes and tonnage, freight and passenger traffic flows, and railroad operating conditions, than is usually found in states with less railroad accidents. Accordingly, while Tennessee's current state's inspection needs and safety results differ in response to these variable conditions, Tennessee's future inspection practices could recognize these factors and modify its program accordingly.
8. The current Program management practices and tracking systems appear to be inefficient and lack clear purpose and accountability. This is a source of frustration for both rail inspection staff, who are requested to provide redundant manual reports, and management, who cannot measure program performance and outcomes.
9. Performance metrics are associated with each inspection position, but do not appear to be based on any inspection or accident data analysis. The priority on enhanced inspections now being used is not based on statistical or accident data, but rather on the fact that a decision was made to focus the limited inspection resources on areas of greater potential severity associated with accidents/incidents involving hazardous materials, passengers, and in those areas of higher population density.
10. Generally, inspectors develop their own inspection plans weekly and submit the plan (weekly itinerary with limited information) and an Outlook calendar. There is no tracking of the inspectors' daily activities except at the beginning of the day (call or email) and at end of the day. From a safety standpoint, the actual location of an inspector during any given time of the day is unknown and poses a risk.
11. Even though this is a "partnership" with FRA, FRA appears to give little to no feedback on quarterly plans. There is little coordination between FRA and TDOT on work to be accomplished to avoid redundancy and to maximize coverage of inspection priorities, unless it is a joint audit inspection ("blitz").
12. Currently, staffing is viewed as inadequate to cover the volume of inspections needed by the Program. This opinion is supported by the reduction of staff over the years. Staffing levels have been in steady decline over recent years from an original level of nine to the current level of four and the current remaining staff has reached or is approaching retirement levels of service in the next few years. It is important to leverage the significant experience of the existing staff to train future inspectors.
13. It is difficult to retain new hires due to the current pay levels of the inspection positions and the higher market value for their skills outside the Department once they have been trained and certified for FRA inspections. This is a significant risk to the sustainability of the current program.
14. TDOT currently has only one inspector performing limited inspections that are associated with the Operating Practice discipline due to his managerial role. However, based on

analysis of accident/incident data, most derailment causes were due to Human Factor, which may be best addressed by the Operating Practice discipline inspection.

15. A large portion of incidents occur at highway-rail crossings. The Program places a priority on these locations for inspections already with upward to 50 percent of the inspection time being committed to State crossing inspections. While the crossing inspections are limited to crossing surface, other duties like inspection of new construction, walkways, complaints (both from citizen and railroad) and other obligations are also addressed on the inspections and may overlook other, more prevalent, contributing factors to these incidents. Also, inspection data depicts a program that has wide ranging inspection intervals. Many sites are inspected many times leaving others with little to no attention. There is also no formal coordination of inspection activities at crossings with the Section 130 Program, unless a crossing accident or fatality occurs, which is communicated to the manager of the Section 130 Program, which could benefit from additional crossing data collection.
16. No data exists that best determines the correct number of railroad inspectors in a state relative to discipline. In fact, each state has different climate, geographic, railroad traffic, and railroad operations conditions, and inspection needs and safety results vary accordingly. Freight railroads use their institutional knowledge to determine what works and does not work for their operations and to comply with federal regulatory requirements. States do not fit the same model; instead, states need to assess what kind of railroad safety aspects its citizens are vulnerable to and adjust their staffing profile accordingly. In other words, the determination of which disciplines the state's railroads are weakest in, or areas where the state's railroad (or shippers or receivers) are experiencing challenges in maintaining safety or compliance with regulations, requires a detailed discussion within that state, and potentially in concert with the state's railroads, FRA, shippers, and receivers. The state can choose to supplement oversight in those areas and enforce compliance or collect data to help improve rail safety in the State.
17. Under current state law, TDOT does not have adequate legal recourse to enforce State requirements on railroads without extensive effort. FRA has better means to enforce compliance of Federal regulations on railroads.

9 Recommendations

Prior to making recommendations, it should be noted that statistically, Tennessee is doing reasonably well in comparison to other states based on the review of accident/incident data for a recent ten-year period. There are successes occurring in current railroad safety programs and TDOT's Rail Safety and Inspection Office, in partnership with FRA, is a part of that success. However, based on the previous conclusions, there are areas for improvement and reason for evaluation of available options to determine a best path forward in the interest of public safety and stewardship. The following recommendations by the Consultant team are based on the information provided by Department staff, responding railroads, the FRA, and with peer programs as well as analysis of FRA railroad accident and incident data.

Each recommendation may require additional research to determine feasibility within the Department's current policies and procedures, as well as funding availability, and additional details to be considered actionable. Some depend on the implementation of other recommendations and may not be appropriate as a standalone change to the Program.

9.1 Programmatic Recommendations

Since there is state law requiring some level of railroad inspection by TDOT, coupled with the fact that there is dedicated funding for the purpose of inspecting railroads, the base recommendation is that TDOT continue to inspect railroads in accordance with state law. State law does not, however, dictate what the inspection regimen should be and TDOT is permitted to develop an inspection program that is appropriate for the needs identified and resources available. TDOT could choose not to participate in partnership with FRA and still meet requirements under state law.

The Ton-Mile Fee revenue source has surplus annual funding and an available pool of funds with which to draw for investment in the program. For these reasons, it is our recommendation that a program be defined that best utilizes those available funds to develop the framework of a more efficient organization and processes that better achieve TDOT goals for the inspection program in order to best benefit safety in accordance with the purpose for which the funds were intended.

The next recommendation, and the first action item, is to define a clear mission statement and objectives for the Program. The current goal of the Program is stated in the 2018 Tennessee Statewide Rail Plan (as provided by TDOT) as "The goal of the Office is to reduce and eliminate dangerous or hazardous conditions for railroad employees and the general public." State law cites, "Such inspections shall be conducted to assure the safety, health, and comfort of rail customers, the general public, and rail employees, and to abate and remove any dangerous or unhealthy conditions found to exist in these locations". The mission of the Program should be defined with these in mind, which recognize TDOT's authority and responsibility to serve both rail employees and the public, which includes highway users in contact with the railroad system.

Program objectives are also needed to define underlying principles that will form the framework for establishing benchmark goals for the Program. Based on our understanding of TDOT's desire for the Program and the current practices, objectives should be defined to establish a data driven process to be used to set priorities, goals, and performance metrics for the routine management of the program. A second objective should be to develop Program processes and systems for real-time reporting of Program plans and results to provide management a basis for decisions and transparency for the public and railroads the Program serves. From this, re-evaluation of the partnership with FRA should be made to determine if the partnership is aligned with the mission and objectives of the Program. Based on information obtained from others, with available and dedicated funding, most states choose to partner with FRA to gain the benefits of training and assistance. That is expected to be the case for Tennessee, which would be consistent with the results of this study and a basic recommendation.

Appendix 12 (Continued)
Excerpts from the 2019 Rail Safety Inspection Program Top to Bottom Review

Once a mission statement and objectives are complete, TDOT should re-evaluate the current management of data as a priority. It will not be until there is sufficient data to assess the Program's current activities that an appropriate set of goals and associated performance metrics can be established for the Program and its staff. This is a critical initial step, as current data is insufficient to clearly make decisions regarding the best use of current resources and what future resources are needed. To achieve this improved management of information, it is recommended that TDOT utilize a portion of the current balance of Ton-Mile Fee funds to create a new or upgraded data management system for the recording and reporting of railroad inspection data, similar to the best practice illustrated. This is discussed in more detail below. With a new system in place, a period of inspection activities, expenses, and results can be analyzed along with accident/incident data to better set Program goals and inspector work plans.

Note, a new data management system is not a requirement to add the needed data analysis to the Program. An alternative or interim measure would be to define protocols for routine analysis of FRA data that is currently available to the Program. FRA provides training and instruction on utilizing their data for creating and implementing a data-driven process for planning inspections and analyzing data. This too is discussed further below.

In coordination with the development of better Program data management systems and practices, it is also recommended that TDOT redefine the role of the Rail Safety Manager to resemble a Program Manager role to be more aligned with development and implementation of the new systems and data driven processes and less focused on the daily management of inspections.

The Rail Safety Program relies on inspectors and specialists that have gained technical knowledge and experience. A succession plan should be developed to address the anticipated exit dates of inspectors and managers. Tennessee should consider in-house training and development of inspectors and cross training to acquire qualified staff. Also, due to the difficulty in retaining staff, it is recommended that compensation increases are considered in conjunction with increased performance metrics.

These programmatic recommendations form the foundation for the more specific recommendations that follow. As stated above, current information is insufficient to clearly define all necessary action items to achieve the most efficient Program possible. However, there has been significant research for this study that can provide reasonable recommendations that can be the basis for the future definition of the program. These recommendations are to be discussed with Multimodal Division Leadership with regards to current TDOT policies and procedures to determine which are most feasible and which warrant further investigation and detail, or possibly eliminate some recommendations from consideration.

9.2 Data Management and Inspection Tracking Recommendations

Improvement in the ability to set priorities and assess the Program's outcomes are vital for TDOT to achieve these goals, a web-based data management system that allows a more rigorous analysis of inspection and accident data, tracking of trends, and identification of opportunities for improvement is crucial in enabling the Program resources to be allocated efficiently and effectively. As part of this data analysis and tracking process, the development of Standard Operating Procedures, including methods and best practices for inspections, inspection data and accident analysis, and review and interpretation of data, will enable Tennessee to identify trends, outliers, and areas where additional resources are needed.

To support these efforts, it is recommended for TDOT to seek the development of a web-based system of customized tools that assist data collection, analysis, tracking, and reporting tools to fit the specific needs and goals of the Program. With Ohio and other states beginning to realize the benefits of implementing data management strategies, TDOT has a similar opportunity to address many of the recommendations in this report in a data management system customized for TDOT's goals.

Developing a comprehensive system for TDOT should be approached in a phased manner. Each of the phases of development would include several important steps, including requirements gathering, system and data design, application development, stakeholder testing, and a documentation and maintenance period. Subsequent phases would build on previous investments by either expanding or refining system elements or by creating new modules and workflows that leverage the architecture developed in earlier phases.

In a phased approach, the first phase of system modules to be developed should address TDOT's highest priority items first, providing the largest impact earliest for the program. Described in more detail below, these first modules should focus on the following concepts:

- Mapping and charting for internal field inspection management. Analytics to identify trends and opportunities throughout the Program.
- Decision support tools to aggregate data, automate reports, and track key Program metrics.
- Public engagement through reporting, mapping, and public input forms.

These features would enable the Program to be more efficient and effective with its resources and efforts in both the near- and long-term. More specifically, it is recommended that the application include the following elements for the initial phase of development:

- A mobile inspection application that enables inspectors to complete the inspection process from the field with access to all related activities, including traffic volume, number of accidents, condition of roadway and signals, future TDOT construction plans, etc.;

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- An inspection dashboard that enables TDOT to schedule, review, and report on the time, and type, and duration of the inspections;
- A reporting dashboard to measure, track, and report trends, measure effectiveness of inspections by discipline, inspector, railroad, location, type of defect, and type of commodity;
- A program monitoring system to assist with establishing goals and track adherence to those goals; and,
- Integration with other systems, such as TRIMS and FRA databases, if possible.

Several additional features and modules that could be considered for this or later phases, including real-time video feeds, interactive public mapping of crossing and safety data, automated reporting, and public commenting forms. As previously described, later phases would bring features and tools online that enable the Program to build from existing functionality and implement new modules into the existing system.

The size of the investment required to develop and implement this system would be determined during scope of functionality identified by TDOT stakeholders. It is recommended that TDOT use the requirements defined in this report to establish a baseline set of requirements for development and implementation.

For this study, research was performed to determine an order of magnitude of an investment for a new data management system. The results of the research were non-determinate based on the information available, but an order of magnitude can be derived from the following information regarding costs. Note these are not quotes of actual costs and a real determination of the cost to develop and implement a new system will only be determined after defining the actual scope and functionality of the desired system and discussion with developers based upon the needs of Rail Safety Department.

- Ohio spent approximately \$600,000 initially on their system and licensing fees are estimated at \$75,000 annually for support. They are very pleased with their system and are currently contracting for additional upgrades.
- A software vendor that provides similar software for railroad asset management and inventory stated they could provide a system for state rail inspections for approximately \$250,000 a year annually (no capital costs). However, that is based on the entire rail system in Tennessee being included in the database. This approach could be scalable.
- An engineering consulting firm with a GIS and Information Management team estimates a custom data management system that meets the recommendation's size and complexity could be developed for less than \$500,000 with variance for functionality specifications. Additionally, depending on hosting requirements, annual hosting and maintenance costs would likely not exceed \$50,000 and costs and support could be managed by level-of-service based contracts or internal TDOT IT Division at a potential cost savings.

While it may be desirable to have the functionality of a new data management system, it is not a requirement to implement real data-driven processes into the Program to achieve the basic goals of the Program. At a minimum, the Program should define policies and procedures that follow FRA's guidance on setting Railroad Safety Inspection Priorities. FRA provides two databases, the Railroad Safety Information System (RSIS) and the Railroad Accident Incident Reporting System (RAIRS) for use by states to effectively manage their programs through analysis of data. States that partner with the FRA have access to both sites. Actionable steps that should be taken by the Program in the absence of custom data management system include, but are not limited to:

- Establish a routine of evaluating and recording inspector output (suggested monthly). The inspector activities are available from the RSIS secure site, which assumes the Department continues the partnership with FRA. As output metrics are recorded, trends may be observed over time
- Establish a routine of reviewing inspection data via the FRA Dashboard, which will help the Program to monitor inspection activities and ensure enforcement and compliance. Metrics for review include inspection days, defect ratios, and violations.
- Establish a routine (suggested quarterly) of reviewing FRA accident/incident data to determine inspection targets and priorities. This can be done without the partnership with FRA, but some supporting data is only available from the FRA inspection systems. Data should be reviewed and recorded for FRA cause category, specific cause, railroad, and location. Over time, trends may be observed.
- The quarterly review and analysis of data should be used to update the quarterly plans required by FRA and by TDOT management. The reports should be expanded to provide more details including supporting reasoning for the next quarter's goals and statistical representation of the previous quarters inspections noting defects and violations cited at a minimum.
- The quarterly report should also include a rolling 12-month look ahead based on high-level programmatic goals with an assessment of Program performance in relation to the annual goals for the Program. Note the annual goals for the Program should be coordinated with the FRA at time of the renewal of the agreement and documented in a Work Plan attachment to the agreement (See below for more details).

It should be noted that the recommendations above were identified through research of the FRA public data (RAIRS) web site and review of the State Rail Safety Participation Program Manager's Handbook (April 2016). A more recent edition was not available for this study and access to the FRA manager's site was not provided. It is advised to review those in relation to current availability of FRA data, tools, and training.

Transparency, public accountability, and visible results are important for Tennessee's Rail Safety Program. To improve these goals, it is recommended that Tennessee consider a means of publication of railroad safety trends, and performance and activities of the Rail Safety Program and Crossing Safety Program. Ohio's annual Rail Statistics Report is provided in the appendix as an example to demonstrate a report TDOT could develop to convey to the public ongoing safety efforts and impacts. Furthermore, it is recommended that TDOT should provide a web-based public reporting system that enables the public to see and understand the results of the rail safety sections activities and the actual safety compliance and results of Tennessee's railroads. The Rail Safety and Inspection Office should work with the Community Relations Division to develop documents and web portals appropriate for public consumption. Links to example sites for other states are provided in Section 6.

9.3 Staffing Plan Recommendations

A programmatic approach to managing the Program is recommended, which places more emphasis on the Program Manager position/role and recognizes that the inspection team is one component with equally important components for many functions such as: administrative support, data analysis, information technology, and public involvement. These are critical functions of the Program in support of its inspection mission. Other components would include planning support and safety. In review of the functional organizational chart shown below in Figure 9-1, note that Administrative Support is a necessary function of a successful program and the Program Manager must have someone to assist with document control and communication to the team, TDOT management, railroads, and FRA. This does not have to be a full time position, but the availability has to be as needed by the Program Manager without conflict with other TDOT offices. GIS, Data Analytics and Planning can be provided by TDOT Long Range Planning or by a qualified Admin (ASA) assigned to the Program. Information Technology support is also critical if the Program is intent on maintaining use of latest technology, equipment and systems to continually improve efficiencies. Public Involvement and messaging is important to demonstrate the value that the Program provides to public safety and can be provided by TDOT's Community Relations Division. All of these functions need to be at the disposal of the Program Manager, in addition to a well-staffed, qualified, and trained inspection team that would report to the Field Inspection Supervisor allowing the Program Manager to manage all the functions of the Program without field inspection responsibilities.

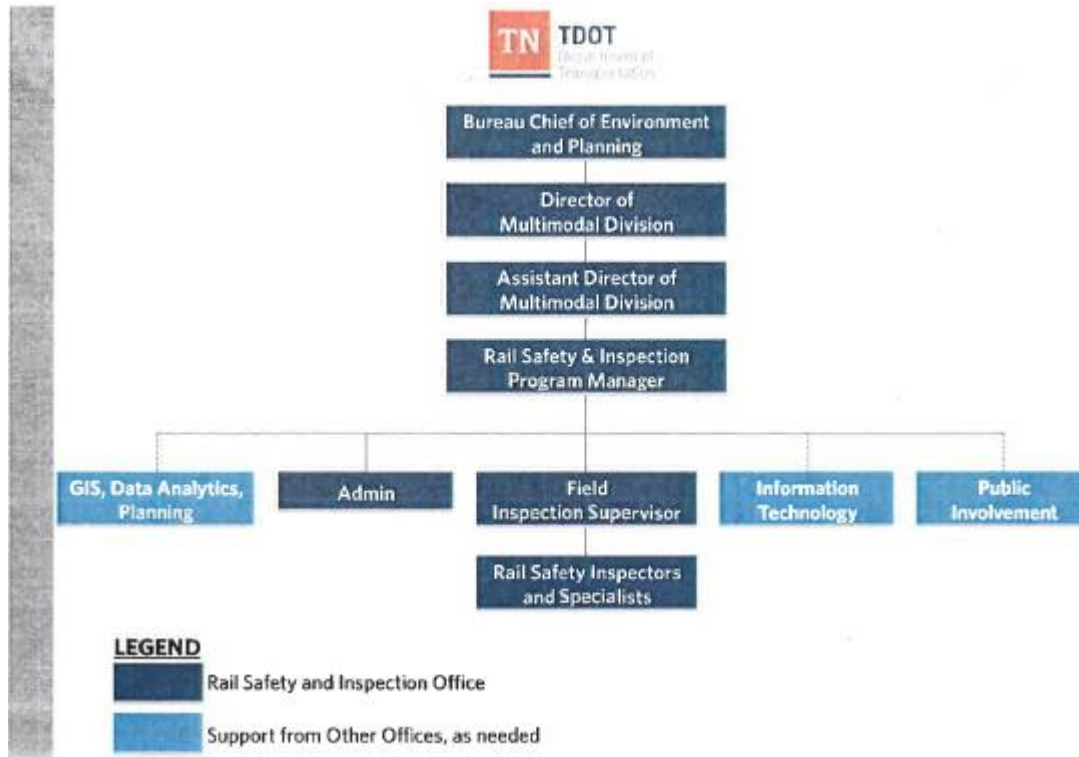


Figure 9-1. Programmatic Functions Organization Chart

Currently, staffing is viewed as inadequate to cover the volume of inspections needed. Intuitively, the program once had nine inspectors and now has four (with one retiring soon) and therefore should need to be expanded if improved outcomes are expected. While this may be true, it is not supported by data, since there are no safety goals set or tracked to determine the actual programmatic need and in what areas that need exists. For example, it may be shown that additional funds to public education programs would be more beneficial than additional staff to reduce the significant number of human factor related incidents through public safety education and awareness. It is recommended that appropriate staffing levels be determined after programmatic goals are in place and better data available for analysis. With that initial point made, what follows are recommendations for providing an adequate and more sustainable inspection staff based on the current understanding of the program:

- Administrative assistance is a significant need with the current system of tracking and reporting information. Alternatively, a new automated system could provide more accurate storage of inspection data, better linkage to the TDOT TRIMS inventory data, and better reporting of Program results and needs. Without this type of system in place, the Program needs to be supported administratively, with particular qualifications for providing data analysis support.
- Based on review of incident and inspection data, additional inspection resources should be considered first for the Operating Practices and then for the Track disciplines. This is due primarily to current staffing deficiency in the Operating Practices discipline and an

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indication of a need to address safety concerns in the data that are influenced by those types of inspections. Increased Operating Practice inspections could be achieved by assigning that discipline as full-time to the field supervisor position discussed below. Additionally, a track inspector can provide additional support for yard inspections where a majority of derailments occur. Once programmatic changes are in place and Program goals and needs are established, the Motive Power and Equipment discipline could be added to have an account of all FRA disciplines. Ideally, additional staff for inspections should possess railroad experience.

- As previously mentioned, the FRA has a new inspection discipline for grade crossings. Adding the crossing inspection discipline to the Program should be further evaluated after programmatic goals are set and further information and training is available from the FRA.

Based on what was learned from other states, options for perpetuating the rail inspection staff include:

- Consider creating the Field Supervisor Position as recommended by the Rail Inspection Manager in 2015. This position will be responsible for the routine management of the inspection team. However, this position would be a full-time inspection position with FRA certification, as well. Duties for supervising the inspection team would be accommodated with lower performance metrics for state crossing inspections. This will allow the Program Manager position to focus more on management of the Program in collaboration with Division and Department leadership to develop and implement the programmatic recommendations above.
- Raising compensation levels to be competitive with FRA pay scale. This was done by Ohio and Illinois with reportedly large success and is currently being considered in other states. This may require modifying the classifications from Inspector to another classification within the Department that would be applicable to the higher pay rates. Many states have issues with retaining competent staff due to the compensation levels and travel demands that often are associated with statewide inspections. If measured in terms of inspection services received for costs incurred, the cost of continual nonproductive training due to turnover precipitated by low salaries may be more expensive than maintaining an experienced inspection staff at competitive salaries. Note, in following the Ohio model, additional compensation would be associated with higher performance goals, which have been proven to be possible with improved program efficiencies in place.
- Cross-train other TDOT staff members to perform highway-rail inspections and utilize the Regional and District staff to participate (See work plan section). This may be particularly applicable to the current scope of crossing inspections, since no specific training is required.
- Alternatively, develop cross-discipline Rail Safety Inspectors for FRA inspections by adding the new FRA Highway-Rail Crossing discipline to those already certified in other

disciplines. This would be applicable to expanded scope highway-rail crossings (See work plan section).

The staffing levels suggested by the recommendations for the Program functions shown in Figure 9-1 above should be able to fit within the current funding levels provided by the Ton-Mile Fee revenue. Based on information reviewed for this study, the Program expenditures did not reach half of the funds available for the 2018 staffing levels. With the pending retirement of Mr. Paul Davis, there should be funds available to re-staff that position, if desired, while adding one more FRA disciplined inspector (Field Supervisor position). Based on assumptions of future costs, current funding levels may support as many as 6 inspection positions, along with the manager position and administrative support. However, additional positions should be considered to cover more FRA rail inspections and state inspections after the Program has established the programmatic mission, objectives and goals and a detailed cost analysis performed.

The Rail Safety Program relies on the ability to hire inspectors and specialists that have gained technical knowledge that is only learned from on-the-job training provided by railroads. Changes in railroad industry employment practices may make it difficult or impossible in the future for Tennessee's Rail Safety Program to have a ready supply of experienced and effective inspectors. A succession plan should be developed to address the anticipated exit dates of inspectors and managers, and Tennessee should consider in-house training and development of inspectors.

9.4 Work Plan Recommendations

Management should be more involved in directing inspectors, selecting locations, and areas of concern. At the present time it appears that inspectors set their own schedules and locations of work. That is not uncommon in review of peer states. However, with clear objectives and analysis of data, management and the inspectors, and FRA should work together to focus on areas of major concern. For this reason, the work plan recommendations need to follow implementation of other programmatic, staffing, and procedural measures that will better inform the development of the work plan.

The priorities of rail inspectors in Tennessee should be data-driven, such as being based on the date of last visit or having a higher density of noted defects and violations at a given location or locations on the state rail network. Tennessee's rail inspectors often decide that a segment of the state railroad network should be monitored more closely, owing to behavioral or operational problems reported to or tracked by the inspectors.